# The Builder.

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*The Social Science Association in Glasgow.*

THE meeting of the National Association in Glasgow, which was opened on Monday last, and will close on the 29th, has been in many respects very successful. The number of tickets sold, 2,600, if not more, is larger than on any previous occasion: there has been a good supply of papers, and some of the discussions, especially on mercantile and international questions, will probably produce fruit. The receipt of a letter from Professor Katchenowsky, of Charkow, in the heart of Russia, suggesting a wide extension of the operations of the Society, so as to give its proceedings an additional interest in the eyes of all countries, was a subject for much congratulation, as showing how far the Association had already spread its feelers. At the meeting of the Council on Monday, with which the business of the week commenced, a liberal and wise offer was made anonymously, by one who, himself "a poor boy fifty years ago," was anxious that other poor boys, on leaving reformatories and similar institutions, should receive a handbook of advice and information for assistance through life. To obtain this handbook he thought a wide appeal should be made; and he proposed, therefore, to offer, through the Association, if they would undertake the management of the competition, 200*l.*, 100*l.*, and 50*l.*, for the first, second, and third best composition for the purpose. Further, he would print, at his own expense, 10,000 copies for distribution. The offer will doubtless be accepted. After the meeting of the Council, the Cathedral, now in a good sound state of repair, opened its venerable doors to receive the members and associates, and the Rev. Dr. Robertson delivered an excellent discourse, lucid, sensible, and appropriate, showing the connection between his text, "Thy Kingdom come," and the objects of the Association. He said:—

"Touching some of these objects, any minister who has had charge of either a town or a country parish could easily say a great deal. It has fallen to my lot to have some short experience of both positions; and, in both, one soon sees enough to make him pray heartily for social amelioration. It is not long till one who attains to the somewhat intimate knowledge of rural life a country minister can hardly fail to acquire, discovers with pain that, though there is much in the character of our peasantry he cannot but admire and love, he must modify, to a great extent, the poetical ideas of his youth about the cottage in its nook among the trees, and with its blue smoke curling up to heaven, being quite so sacred, as he had once imagined, to innocence and peace. And in the towns—I will not speak of the lower orders in terms of disparagement: there is among you very much good feeling, very much one cannot but respect greatly; yet, how often are there sights that come before him at which one's heart bleeds? I could tell of such a thing, in this very parish, as 48 families—that is to say, probably about 240 human beings—living in one single tenement. How can there be health or religion there? I could tell that, to my certain knowledge, you might have seen there, within the last ten days, children literally without a rag or clothing of any kind, and the mother with so little as scarcely to be fit, for decency's sake, to appear in the presence of my valued assistant, by whom she was visited. These things are saddening; and yet there is something almost more saddening still than such abject misery—in the perfect self-satisfaction with which hundreds flaunt in gaudy dresses who can hardly read their Bibles, and cannot at all sign their own names; and with which many parents, who are making tolerable wages, consider themselves good, worthy people, who are doing their duty to society, and are quite entitled to all sorts of trusts, politically and otherwise, while they are yet neglecting altogether, or discharging in the most perfunctory way, one of the first and most sacred trusts of nature, by either permitting their children to grow up without education, or by withdrawing them from school whenever their poor young hands are able to contribute in the least degree to the earnings of the family. But why do I speak of these things? Fortunately the public mind is become thoroughly awakened to them, and we are begun to be determined that, God keeping us, they shall not continue. Preachers, poets, novelists, statisticians; the pulpit, the platform, and the press, have all been occupied about them, and not without result. It has not all been talk or sentiment. Witness the ragged and industrial schools, the reformatories, the model lodging-houses, which are the growth of the last few years: witness the extension of the ordinary means of education: witness our city missions, and, what seem to me the best of all kinds of missions, the territorial missions of churches: witness many other agencies that might be named. May I not be permitted to add, witness the present meetings we of this city so unfeignedly rejoice to see convened among us."

In the evening, Lord Brougham, as president, delivered his address in the City Hall, reading for two hours. The address was too long, and at times his voice was so low that they who sat at the farther end of the hall could hear nothing. Nevertheless they remained, giving testimony of respect and admiration; and at the close hearty shouts showed the general appreciation of a remarkable effort by a man of 82. On commencing, he said,—

It is impossible to open the congress without expressing the satisfaction felt by all, that this, our fourth meeting, should be held in the great capital of the west of Scotland, the centre of her manufactures, and the emporium of her trade. But we also are highly gratified at finding ourselves in a place not more renowned in the history of commerce than in that of philosophy, and of those branches of philosophy which have exercised the most important influence in the promotion of Social Science. It was here that Black made those discoveries which have changed the face of natural science more than any since the days of Newton; that Watt gave the great invention to the world which has made such an alteration in its aspect, and such a revolution in its fortunes; that Stewart learnt and Simson taught the ancient geometry which he restored; that Reid placed the philosophy of mind upon its firm foundations, and freed it from sceptical cavils; that Millar traced the history of the constitution on principle,—freed it from vulgar errors of empirics as well as of absolutists; that Smith established those sound doctrines, now happily become the faith of practical statesmen, as they had long been of the learned, connecting the commercial gains of all nations with the improvement of each, and making their mutual intercourse a mutual and equal benefit, and the bond of peace. Nor let it be forgotten that here the first step was made by Birkbeck (on which, five-and-thirty years ago, I congratulated you) of throwing open to all classes the temple of science, and showing that the highest intellectual cultivation is perfectly compatible with the daily cares and toils of working men. These are proud recollections for Glasgow; and this pride is shared, not envied, by her sister, Edinburgh, whose own glories are far too bright to dread being outshone.

Of the various topics treated of in his address we must confine ourselves to what he said of one, namely,—

*Co-operative Societies.*

Nothing can be more gratifying, in this and in every other view, than the success of the great measure which the working classes themselves have lately adopted to provide for their comfort, to husband their resources, and to protect them from imposition, by the formation of Co-operative Societies; and happily these have greatly multiplied, especially in the manufacturing districts of Lancashire and Yorkshire. Such societies are of two kinds. The one has for its immediate object to expend the income of each member to the best advantage for himself; the other to enable him to obtain the largest return for his capital and industry. Sixteen years ago, forty Rochdale artisans, desiring to establish a society of the first kind, amassed, by a weekly subscription of 3d. from each member, the sum of 28*l.*, hired a room for a store, laid in a stock of necessaries, and began to trade; selling not only to members, but to all who would buy. The enterprise provoked laughter. A neighbouring shopkeeper boasted that he could carry away the whole stock in a wheelbarrow. Now, however, the single room is multiplied into many distinct shops, spread over the town, and the weekly vend of the society exceeds 2,700*l.* per week. Every member must be the owner of five shares of twenty shillings each, the permitted maximum being a hundred such shares. The capital is paid in by small weekly or quarterly instalments. All the transactions of the society, whether purchases or sales, are for ready money, the entire absence of credit being the corner-stone of the institution. The customer, whether member or stranger, is charged at the same price as at the ordinary shop of the town; but at the end of each quarter a division of net profits is made, and he receives his quota according to the amount of his purchases. To arrive at the net profit, the following deductions are made from the gross returns—the cost price of the goods, the current expenses of the stores, including the wages of the manager and his assistants, rent, repairs, a proper allowance to a depreciation fund, and 5 per cent. for interest upon capital. The residue is the net profit, for which, however, before it is divided among the customers, 2½ per cent. is deducted for the maintenance of a library and a news-room. The society is governed by a committee elected from the members, which meets weekly, when it gives patient attention to all complaints. If real cause of dissatisfaction exists it is removed. If the complainant is in error he is reasoned with; and so successful has been the course taken by the committee that, although arbitrators have been appointed from the first, pursuant to the Acts under which the association is registered, yet it has never been necessary, even in a single instance, to engage their services! The benefits derived by the individual in the expenditure of his income upon this plan are manifold. It is enough to enumerate a few. First, antagonism of interest between buyer and seller is annihilated. All motive, therefore, to adulteration, or in any way to lower quality for the sake of diminishing price, is absent. No extra price is put on the goods to pay the rent of shops in expensive situations, nor for the plate-glass or other costly fittings, nor for the loss occasioned by the expense of articles in the windows to attract customers, nor for advertisements. Indeed, show is altogether discarded; and, while no cost is spared to insure high quality in the articles themselves, no money is wasted on the means of attraction. The exact price of the article, too, is not very material. If the price is high, the customer's returning profit is also high, and *vice versa*. But not only economy is consulted: the improvement of the character and habits is incalculably promoted. The workman is stimulated to the exercise of self-control, beyond his reach in ordinary circumstances. He must refrain from anticipating his income by running in debt in order that he may be able to pay ready money, and also to acquire capital; and to the self-denial essential to compassing these objects he is urged when he has their advantages clearly and forcibly set forth by his brother members, and more than all, by the example of the body of which he forms one. Finding, then, strict economy a necessary condition to his maintaining the rank to which he has aspired, he casts about that he may so exercise his thrift, and abridge his expenditure, only in what is not essential to health and comfort; and soon discovers that abstinence from drink and tobacco not only subtracts nothing from his wellbeing, but greatly adds to it. But a working man out of debt, acquiring capital, however slowly, and abstaining from stimulants, is on the road to happiness, and with a prospect of attaining

it as bright as is vouchsafed to any citizen of the State, even the highest in the land.

The second class of these institutions, namely, those which have for their object to enable each member to augment his income, are at present but few in number, and their experience has been short. At Rochdale, a society was founded four or five years ago for spinning cotton-yarn and weaving it into calico. The principal distinction as regards financial arrangements between the two classes is, that the net profits are divided among the artizans instead of the customers, each in proportion to his or her wages, the wages being fixed according to the rate of payment in the mills of the district. The disastrous years of 1857 and 1858 sorely tried this infant establishment, but it weathered the storm successfully; and although during a period of fifteen weeks no sales were effected, or sales only to a trifling amount, yet the hands were never put upon short hours, although the other mills of the town yielded in this respect to the pressure of the times. It is, however, far too early to predict success for co-operative societies of this class with any degree of confidence, or to speak of them otherwise than as hopeful. It appears manifest, and the observation is important, that co-operation is not only distinct from communism or socialism, but repugnant to it, far more so than to the ordinary course of trade, with which, indeed, it agrees in giving to every man the benefit of his own industry, skill, and economy. Co-operation leaves its votary in freedom, whereas communism, which makes him receive according to his wants, instead of according to his merits, extinguishes the ordinary motives to exertion; and failing, as it always has failed, to induce men to work from higher motives, must, if it continue in action, fall back upon coercion. Communism is in truth slavery in disguise; but, as the slaves are also their own masters, they quickly emancipate themselves; and that being done, the communities of socialists come to an end. Such is the appointed lot and fate of the kindred associations arising from strikes, even where these are carried on without breach of the law—that is, without in any manner exercising compulsion, directly or indirectly, to obtain the increase of members. This most interesting subject will certainly occupy both our general and judicial departments.

Sir John Pakington, Lord Ardmillan, Sir Archibald Alison, and Sir John Lawrence, afterwards spoke. On the following morning the Lord Advocate delivered his address as president of the jurisprudence department, and then the various departments went to work in earnest, reading papers and discussing them—some fully, but many otherwise.

In the fourth department, "Public Health," Mr. Edwin Chadwick presided, in the absence, through illness, of Lord Ebrington.

Dr. James Wallace read a long and elaborate paper "On some of the Causes of the high Rate of Mortality in Greenock, with an Account of their Origin, as well as the Measures which have been taken, and are still required, for their Abatement and Removal." After a consideration of the nature of the soil, the position and extent of the town, its mode of construction, particularly its over-crowded condition, the causewaying of the streets, the nature of the houses, the mode and nature of the water supply, the drainage, as well as enumerating certain nuisances of a very deleterious character, such as the West Burn and the contiguous mill dam, he went on to show that from a very early period continued fevers had exercised a most malignant influence, and almost always in the crowded and filthy parts of the town. The Infirmary report and other documents were quoted to show that since the commencement of that institution, half a century ago, no fewer than 12,360 cases of fever had been there treated, the average cost of each of which had been exactly 2*l.* 2s. 6d.; thus showing that, for the treatment of those afflicted with this disease alone, the subscribers to the infirmary had paid in fifty years no less a sum than 30,000*l.* And if to this were added the expense entailed on the community by the three epidemical visitations of cholera in 1832, 1849, and 1854, in which years there were affected 897, 964, and 141 respectively, in all 1,902, they would find a cost of 35,000*l.*, the annual interest of which, if properly and regularly invested, would, long ere this,—not to speak of the desolation of many happy homes,—have saved the ratepayers much of the difficulty which they would soon have to encounter. But this sum, large as it appeared, must be far below the reality, as there was excluded from the calculation the number of fever patients who did not come under the eye of the hospital authorities, as well as the widows and orphans whose maintenance from this cause lay from time to time upon the parochial authorities. To show how this condition of the town had been brought about, he gave a short history of its rise and formation, according to which the overcrowding was shown to be the result more of the cupidity of the feuars than of the proprietors of the land; although, at the same time, he urged that the latter were not altogether blameless, because they had failed, in certain parts of the town, to lay out their land according to a plan in conformity with the ideas of modern sanitary legislation. The errors on the part of the constituted authorities were then taken up, when it was shown that nothing in the way of provision against the evils complained of was attempted till within the last fifteen years.

*Condition of Glasgow.*

Dr. McGill read a paper on the "Sanitary Condition of the Lower Districts of the City of Glasgow, chiefly as regards Overcrowding, with some of the Causes leading thereto, and several proposed Remedies for the Removal or Mitigation of existing Evils." In the course of it, Dr. McGill said,—

"As illustrative and typical of a state of things common in the centre of the city, I will take a square or area covered with buildings and occupied as dwelling-houses. The square or area contains, after allowing for two large public works situated in one of its angles, nearly two acres and a half, every foot of which is built on, with only a few narrow spaces for passages, and having a population of the lower labouring class of about 2,800. This gives about 1,100 human beings to every acre, or 1 to four square yards.

One house or building in this area, 28 by 14 yards, having a common stair, contains a population of 120; and, as every foot of ground is built on, it gives only 3¼ square yards to each inmate.

Again, as respects the interior of the apartments, assuming as correct that every adult requires about 700 cubic feet for respiratory purposes, the greater number of the apartments in the square are so small and ill-ventilated, that in scarcely any is there anything approaching an adequate supply of vital air. In some instances, so small is the space, that, even were the apartment well ventilated, which it seldom is, there is not a sufficient supply of air for one, while there may be four or more, living and sleeping in the apartment. One or two examples will suffice:—

One apartment, containing 450 cubic feet, with very imperfect ventilation, and having four inmates.

One apartment on the ground flat, with a damp earthen floor, little bed accommodation, little furniture, and both in a filthy, unhealthy, and unwholesome condition, contains only 900 cubic feet, and little ventilation, for nine individuals.

These are merely typical of a large class of houses which, in addition to the smallness of the apartment, and deficiency or absence of ventilation, have what furniture there is, in the shape of chests, &c., piled up in the apartment, so as still more to contract its size, with large quantities of dry and wet clothing hanging through the apartment, in the beds, and in front of the beds large fires and filthy personal clothing.

In numerous instances those apartments, although they may have windows, yet these cannot be opened, in consequence of opening into filthy dungsteads, the smell from which is intolerable, and occasionally the fluid filth passes through the walls, and causes a damp, unwholesome apartment.

There are many lodging-houses in this district, licensed and otherwise, and while the former have generally three or four beds in an ordinary sized apartment, with narrow passages between them, and breathing space to the extent of about 150 feet for each inmate, the latter, being under no control, are frequently much worse. Assuming the boundaries of Glasgow proper as four miles in length, by three in breadth, thereby giving an area of twelve square miles, with a population of 400,000, we have about 92 square yards to each inhabitant.

While this gives a very large average space as compared with what exists in the districts to which I have referred, yet it is small as compared with Leeds, which is stated to have an area of forty square miles, with a population of 220,000, or 563 square yards to each individual. If this is correct as regards Leeds, it illustrates what I have already alluded to, of the different class of houses in the two places, and shows that Glasgow ought not to be judged by the same standard as respects its sanitary condition.

The construction of the houses in the square or block which I have taken for illustration, and which prevails in other parts of the city, is of a faulty description, viz., the buildings fronting the street are frequently of the height of four or five stories, while those in the centre of the square or area, being much lower, not above two or three stories in height, are deprived of that ventilation so necessary for the due preservation of the health of the inmates. The air in the centre compartment would almost be in a stagnant state were it not for the passages, some of which are occasionally yet rarely thorough, thereby permitting a somewhat imperfect degree of ventilation. Again, in consequence of the great height to which the buildings have been carried, and the fact that every foot of ground has been built on, there is not only the congregating of a large mass of human beings, but also the absence of an open space behind the buildings, for the purpose of ventilation, so that of necessity the air in these places is of a very impure and unwholesome description.

Apart altogether from the buildings, there is an insufficient supply of dungsteads, or ashpits, and other conveniences for the wants of such a great number of inhabitants as are collected in the houses on either side of these long narrow passages.

There is also, frequently, an insufficient supply of water.

The closes and stairs leading to the houses, the houses themselves, and the external walls of the buildings, present, in numerous instances, either from the inability or cupidity of the owners or occupiers, such a ruinous, smoky, and filthy appearance, that they are unfit for human occupation.

Want of personal cleanliness, want of necessary clothing and furniture, and what little there may be of a mean, filthy, and unhealthy description.

Irregularity of meals, the use of injurious articles of diet, want of cleanliness, of clothing, and of pure air; absence of mother for the whole day, and consequently the want of the natural aliment; the system of drugging with laudanum, alcohol, and other poisonous agents, have a most baneful influence on infantile life.

One of the chief causes, I am convinced, is due to the prevalent custom of the abuse of intoxicating drinks. I will, instead of enlarging on this evil, which confessedly exists, give the result of my observation in the police office.

According to the calculation of Dr. Strang, the annual increase of the city is at the rate of 3·15, which, applied to 95,000—as I believe the 55,000 have been stationary—would give a population at the present time of about 175,000. For the population of 175,000 the parochial board has appointed twelve medical officers, the labours of eight of whom are chiefly confined to the small space of a quarter of a mile, and to the population of 55,000.

In speaking of various methods of improvement, the reader said, amongst other suggestions,—

1st. In rural districts a highly-to-be-commended system prevails of giving small rewards, in money or otherwise, to peasants, for the best and most cleanly kept cottages. Were such a system greatly extended, and not confined to rural districts alone, but introduced into our cities and towns, it might ultimately, at a very small cost, have such an encouraging and stimulating influence on the character and habits of the people that the appearance of dwellings in low localities would be reversed; and, instead of, as now, finding nine-tenths of them in a filthy and unwholesome condition, that proportion would be distinguished for a clean, wholesome, and healthy character.

2nd. To invest the authorities with increased powers to enter dwellings in low districts, and, at the cost of the proprietor or the public, to have them put and maintained in such a state that they shall not continue, or again become, the centres from which emanate disease and death. A very small tax would suffice to do so; and, if it is considered advisable to attend to the sanitary state of the city externally, much more is there a necessity for a strict supervision over the interior of houses.

Mr. J. Watson read a striking paper on "The Measures required for Improving the Low Parts of the City, and the Value of Model Lodging-houses." He said there was perhaps no city in the kingdom where the abodes of splendour and refinement contrasted more strikingly with those of squalid poverty and wretchedness than the city of Glasgow. It was not to be concealed that there were certain portions of it in a most frightful condition, and which, like so many plague-spots, demanded investigation and called for legislative reform. There were narrow lanes or closes, running, like so many rents or fissures, backwards to the extent of sometimes 200 and 300 feet, in which houses of three and four stories stood behind each other, generally built so close on each side that the women could either shake hands or scold each other (as they often did) from the opposite windows. In many of these lanes and closes there were residing in each not fewer than 500, 600, and even 700 souls, and in one case he observed thirty-eight families, or nearly 300 persons, occupying one common stair.

Mr. Watson stated, what must be considered very encouraging, that some model lodging-houses erected in Glasgow were paying 10 per cent. on the outlay.

Mr. David Smith J.P., Glasgow, read a paper on "The Necessity of a Building Act for Large Towns." After dwelling at some length on the mortality of large towns, he suggested the following remedies to be embodied in a Building Act:—

1. That every street or lane shall be at least one and a half times the wideness of the height of the house.

2. That every building shall retire at least once its own height from the front.

3. That there shall be no inhabited dwellings underground.

4. That a limit shall be put to the number of inhabitants that may enter by one close, and that a certain number of cubic feet, to be fixed by some competent authority, shall be allowed for each inmate in each apartment. These appear to be the principal arrangements necessary to be enforced. Others in reference to ash-pits, dust-bins, water-closets, drainage, and other matters may also, with propriety, be introduced. In an admirable report, made to the Architectural Society of Glasgow in 1852, several additional suggestions are made, such as;—That there be no back-houses; that the back wall of any tenement, for houses in flats, be a space equal to the height of front wall from the lane; that the lane shall be 16 feet in width; that, in houses for working men, no roof shall be less than 9 feet high, nor any apartment contain less than 1,512 cubic feet, with 21 square feet of light. A space of 60 feet to be left from wall to wall, with a lane of 10 feet in centre, for workmen's dwellings. No dwellings in sunk flats. No concealed beds: all fixed beds to be of iron. The number of dwellings on each landing not to exceed three, making two houses of not less than a room and kitchen, and one house of a single apartment. Stairs to be scale stairs, and not less than 3 feet 9 inches in breadth. To be compulsory on landlords to light all public stairs with gas. He referred, in conclusion, to the sanitary moral and political objects which would be served by the enforcement of such rules.

The Chairman having invited discussion on the papers which had been read,—

Mr. Henry Roberts, F.S.A., took strong exception to a recommendation which had been given, that unfit houses occupied by the poorer classes should at once be pulled down without waiting for the provision of others, and stated the result of his experience on the subject in France.

Mr. G. Godwin confirmed what Mr. Roberts had stated, and said enormous mischief had been done by attempting to dispossess the poorer classes of their dwellings before finding them other houses. He had seen in London many such clearances, and the result had been that parts before greatly crowded had become much more so, and rooms let to one family had, in consequence, been made to receive two and even three. So that, where railway companies, improvement and other societies, were about to take down houses fully occupied, it had been felt necessary to erect others for the labouring classes elsewhere. With regard to the papers, there were really so many subjects presented by them, that it was difficult to say anything in the short space of time at their disposal. What could be more frightful than the picture given to day about Greenock? They need not be surprised at the excessive mortality there: the wonder was that any person lived there at all. But for some extraordinary counteracting influence the evil agencies were sufficient in themselves to carry off the whole of the population. It was perfectly frightful. With respect to Glasgow, it might seem rude for a stranger coming freshly into a place to say anything disagreeable on the subject, but he could not resist making one observation. He had that morning been over some of the wynds and closes at the back of the Trongate and Saltmarket, and he felt bound to say, most impressively, that it was a disgrace to any civilized community—a positive disgrace, and the evidence of enormous ignorance and short-sightedness on the part of the citizens. He maintained that the inhabitants who permitted such a state of things to exist, simply because of the expenditure which the improvement would entail, were not merely damaging morality and sacrificing life, but injuring their own pockets, and perhaps bringing distress and sorrow into their own homes.

Mr. Mossman, Edinburgh, said, with regard to Mr. Smith's paper, that it occurred to him that it would be very beneficial, and tend greatly to further this movement, if the question of the 40s. freehold franchise was brought to bear upon it. It was a social question, and those gentlemen present from England would bear him out in saying that that measure had been a most beneficial one for the working classes. In Manchester, Birmingham, and Sheffield, the working classes had houses of their own, cottages with every convenience, situate in the most healthy localities, all brought about by this 40s. freehold system, which enabled a man, by small periodical payments, to buy up the property he possessed.

Mr. Salmon (of the Glasgow Architectural Society) thought that they must all sympathise and agree as to the necessity of erecting houses for the accommodation of the working classes, previous to taking down the old ones. He would just like to observe that houses had been erected of late years which were as bad as some of the houses built many years ago; and, until some measures were introduced to prevent the extension of the evil, he feared that there would be little abatement in the overcrowding of houses. He had just been making an examination of some of the houses erected during the last year, and he found that in one block, containing forty-two separate houses, the square area allowed to each person was three square yards. In another block of houses built within the last seven or eight years, which accommodated thirty-eight families, all going up one stair, the square area allowed to each individual was two square yards. Now, in the very worst portions of the old town which had been referred to, the square area allowed to each person was 1½ square yard: that was the least allowed to each in the old town; and, generally speaking, it ranged from 1½ to 5 square yards; and yet here they were going on erecting houses with an allowance of two square yards to each inhabitant. With reference to the taking down of houses in the olden parts of Glasgow, he affirmed that the ground would be a great deal more valuable; and that, in a pecuniary point of view, the building of new houses on the sites of the old ones would prove a remunerative speculation to any capitalist who attempted it on a large scale.

After some further discussion, the Chairman said he might state that under the supervision of the police, in lodging-houses containing as many as 80,000 of a population, epidemic typhus had really been banished. Again, in a number of their cities they had reduced the death-rate one-third, chiefly by the abolition of the midden-steads. By introducing both of these improvements, the defects of the old buildings might be remedied in part, although great evils still remained from over-crowding and other things. He thought too little was done in the way of visiting these places. He commenced his sanitary education twenty years ago in Edinburgh and Glasgow. He visited the wynds of Glasgow, and amongst other things found that they were utterly unvisited at that time, although it was pretended they were. He was told by the people that he was the first clergyman seen there for some years. He recollected mentioning this fact to his friend the Bishop of London. "Well," said he, "it is very plain that if they took you for a clergyman, they had never seen one." In visiting the wynds of Edinburgh he gathered very much information with regard to the spread of intemperance among the lower classes.

Some papers were read on "Co-operative Societies" in another department to which we must refer hereafter.

On Wednesday, after Sir J. Kay Shuttleworth's address, a number of very interesting papers were read and discussed in the Health Department, but we must defer our notice.

It is to be hoped that what has been said will have the effect of directing the attention of the authorities to the necessity for immediate action.

## SANITARY CONDITION OF ENGLAND IN EARLIER TIMES.

A SPIRIT which has been shown, in more than one quarter, to prevent, as we think without sufficient general inquiry, useful efforts which have been made to advance the social position of the people, may have some effect in retarding the progress of sanitary science, on which yearly depends the lives of thousands. The subject is a matter of life and death, and one on which the national strength and advancement greatly depend: it is therefore necessary to reiterate a few facts which will, we trust, be encouraging to those who are engaged in making more pure and healthy the atmosphere of large towns; and it should be borne in mind that, with marvellous rapidity, the country population is decreasing and that of the towns is largely on the increase. Towns not long since of small population are growing into large ones, and in the villages are being collected the cottage population, which was, less than a century ago, extensively distributed throughout England. This change of condition does now, and will, for a long time, require the greatest care and unremitting attention.

In glancing at the accounts of the various kinds of pestilence which have passed over this land, it is difficult, bad as the present loss is, to form an idea of the old conditions. Not to refer to more ancient times, London was visited by pestilence in the year 679, and also in 764, 798; and in 801 fever carried off nearly the whole of the people of London. Some idea of its sanitary state may be formed by reading the condition of the London of that day. Slaughtering and burnings took place: the wholesome practice which had for long time been adopted by the Romans began to fall out of use among the Anglo-Saxons: the dead were left imperfectly buried close to the living: the wells became polluted; and, according to such accounts as have been left, the arrangement and condition of the streets, the enclosure of the town by walls, the necessity with those who had any wealth or possessions of adapting their houses to the purposes of warlike defence, and other causes, led to evil. Passing over some time without notice, we will remark that, in 1348, the first dread of the plague alarmed Cornwall. At this time it was reported that the disorder began at Carthage, in Asia, and then passed into Syria, Palestine, Africa, and Europe,—devastating Germany, Italy, Spain, France, and England. In the latter country so great was the destruction of human life throughout the whole land that grass grew in the streets of the once populous cities, the price of provisions and animals of labour decreased, in consequence of the want of buyers, to a remarkable extent; and, in some places, the living were not sufficient to bury the dead).

From all the accounts which can now be gathered, this visitation was general throughout the whole population. There were then few towns much better situated as regards sanitary arrangements than that which has become so great a metropolis. Worse drained and even worse supplied with pure water than in the days of the Roman occupation, the impurities of the soil increased, the houses were closely built together within the walls of cities, the offal of the slaugh-

ter-houses and other refuse was carelessly allowed to accumulate, the dead filling the grave-yards, and personal cleanliness was not so carefully attended to as it was even by the Saxon. Who can be surprised that Old England did not escape a visit from the plague? It is worth while to note how very similar the course which the plague is reported in the above year to have taken agrees with the route of the cholera in modern times. At this visitation of the plague 7,000 persons died at Yarmouth, in Norfolk; and, without referring to other places, it is stated by Stowe, that 50,000 were buried on the site of the present Charter House in London, which had been bought by Ralph Stratford, Mayor of London. If we put the population of the metropolis, at the date 1349, at 200,000, and there seems no clear proof for stating it at a greater amount, the number of persons buried here formed *one-fourth* of the entire population—carried away in a single year.

If we estimate the present population of London at *three millions*—it cannot be much less—a plague of the same malevolence would have killed *seven hundred and fifty thousand persons* in London alone in less than one year, besides those who might fall from other diseases! Three quarters of a million of human souls perishing in this metropolis at the present day, in the time mentioned, would be a matter which would create wonder and terror throughout the civilized world.

In the Rev. Mr. Popwell's work, vols. 4 to 7, which may be found in the reading-room, British Museum, press 2,066, C—a work published about 1816—he urges, having had the advice of some of the most eminent authorities of that time, certain opinions as regards the health of the district of Cornwall, of which he is the historian.

He seems, as is natural with most historians of districts, anxious to place his subject in the best possible light. He writes of the salubrity of the air; of the place being bounded on each side by the sea, with elevated lands which cause the rapidly-running streams to carry away the offensive matter; also by that kind of land circulation of fluids, improving and purifying the air. Notwithstanding the plague raged in most of the towns of this county, the historian is anxious to clothe the neighbourhood which he is describing in the garb of health, but the notes which are frequently to be found, quoted from the books of various writers, show that no one should feel surprised, in spite of the wholesome, natural condition of the air, at the visits of epidemics. See the following quotation from an author of about two centuries ago:—

"The great town of Bodmyn [Bodmin] is situated in a valley equally distant between two seas. It is of great length—nearly a mile—but of one main street and some ragged lanes; a small brooke running through it, and through the churchyard, where dead bodies are interred, by reason whereof the water cannot be salubrious; and that no doubt maketh the town often subject to long and grievous infections: unhealthful it is by nature, and more by the unclean keeping of houses. It hath been larger in receipts than it is now, as appears by the ruins of certain antient buildings in decay."

This is an old note, but here are all the evil conditions which even in the most naturally healthy localities invite pestilence.

Again, Mr. Popwell, in 1816, states, on his own authority, that most of the dwellings in Cornwall, as in St. Keven's Church-town, have, to this day, pits at their doors: their beds are in general rotten and filthy, and they lie three and four together: in this state disease must spread, and too often has pervaded a whole family. At the same time benevolent neighbours are liberal of their wine, their brandy, and their beef; but attention to the far more essential points has been neglected from ignorance. A few matters of clean straw, old sheets, and a bottle or two of vinegar, should be in readiness in every parish, and the parish authorities should be directed to have stagnant pools of filth immediately removed. The want of this sort of attention to the houses and bedding is not confined to the lower classes of the community: many of the farmers who can afford a better provision are shamefully mean in the furniture of their upper apartments, which, not to say the least of them, are filthy; and the paucity of inhabited houses seems to be the only means of exemption from many fevers and scourges.

Bad in a sanitary point of view as was this place in 1816, others must have been even worse in, say, 1487,—a time when the graveyards were still being packed, and when no particular attention was paid to either the drainage, proper building, space, &c., of the dwellings. In this year the "sweating sickness" broke out in England.

Although, in even more ignorant days than this, it was believed that the plague was regularly imported, by human means, in ships,—the sailors dying and then the pestilence raging—sometimes the dropping of a handkerchief has been believed to have spread the plague in towns,—nevertheless, it is not said that the "sweating sickness" was imported in this year, when,—

> "Ere yet the fell Plantagenets had spent
> Their ancient rage at Bosworth's purple field,
> ——— A monster never known before,
> Rear'd from Locytus its portentous head.
> This rapid fury, not like other pests,
> Preserved a gradual course. He in a day
> Rush'd as a storm on the astonish'd isle,
> And strew'd with sudden carcases the ground."

To go, however, to Exeter. At the assizes, held at the Castle in 1585, when the prisoners were tried, "*there suddenly arose such a noisome stench from the bar*," that a great number of those present were instantly affected: of these died the judge himself, Sir John Chesterton, Sir Arthur Bassil, and Sir Bernard Drake, knight; one Robert Cary and Thomas Risdon, esq., justices of the peace; three of the bench and eleven of the jury, who were empanelled to try the prisoners.

The cause of these deaths was attributed at the time to the imprudence of Sir Bennet Drake, of Ash, having taken a Portuguese ship, and sent his prisoners, who were ill of a contagious disease, to the high gaol of Exeter. Undoubtedly in the condition the gaols of this country were at that time, we cannot wonder at fevers being created, and spreading: overcrowded, filthy in the extreme, where were scenes of the most abominable vice and dissipation; who can wonder that "king fever," once having breathed into the place, would feed the particles of poisoned atmosphere on which miasma delights to loiter and prepare for the work, and that the grim and terrible monarch should have been triumphant. Can we wonder that disease spread, and the effects were made visible in the densely crowded and unwholesome courts of justice, close by the gaols? Some of these are bad enough now, but neither the gaols nor the courts are to be considered with those of the above old date. Notwithstanding, in years after the time above mentioned, the gaol fever in the Old Bailey courts spread its pestilence in the close air suitable for its reception, and killed, in the same manner as at Exeter, judges, council, and jury.

We have no evidence that the gaol fever was spread from gaol to gaol, although it is asserted that those afflicted with this disease who had, in consequence of these outbreaks, been discharged, and passed to their unwholesome homes, had there died, and that others had been attacked with a similar disease: the question for consideration is, were those cottages or dwellings referred to much better than the gaols?

In rooms and places without sufficient space and ventilation, when crowded with the sick, it is impossible but that the health of others must suffer. Those who have watched even the best arrangements of the dwellings of this day cannot have failed to note, even in the case of little children, and those of older years who might be near death from consumption or other complaints, the peculiar effluvium which those accustomed to nursing recognize as the sure prognostic of death.

In the case of virulent fever, and in plague, when the body seems even before death to become partly putrid, when the air is filled with malarious influence,—without the best sanitary condition, without space and ventilation, without the most perfect attention to cleanliness, is it unlikely that the germs of disease will spread to those in such condition, and who may be naturally predisposed to it by bodily condition?

In these modern times the attacks of cholera have carried away numbers (fortunately small in proportion to the old plague). In this disease there seems to be no evidence of infection. We have seen hundreds of cases in the hospitals of the metropolis where the nurses were not affected. Here there were better space, ventilation, and other good arrangements. But a small proportion of the medical attendants who so bravely and with so much assiduity did duty both in the hospitals and in the miserable homes of many of the poor, were attacked; nor are those straggling cases to be wondered at when they were for hours, of both day and night, oppressed and fatigued, and kept in the very atmosphere which had been the means of producing this modern plague. Persons removed from ill-drained and unwholesome houses not only in the London district, but also in the provinces, were not attacked, nor was the infection carried into well-drained houses and wholesome places by the surgeons or other persons.

At the last visit of cholera, a vast number of houses were suddenly attacked in the same night. Those who occupied these places were persons of different conditions,—some very poor, but others well off. We made most careful inquiry, and feel certain that the disease could not have been propagated by persons passing from place to place. Even the poisoned well, often referred to, could not apply to St. Ann's-court, for in this neighbourhood we had clear evidence that those affected had used for all purposes no other water than that supplied by the Company. Here, however, were open cesspools; others simply disguised with pans without traps; cesspools, in some cases three and more, in a small back garden, only covered over, but not emptied. Let those who have doubts upon the matter pay a visit to the cholera-stricken part of Deptford, with its total want of drainage, stagnant ditches and pools of water, creeks, &c., filled with poisonous mud, small rooms in which are families,—and where missionaries when they call are obliged to open the windows in consequence of the poisonous air. Here cholera, domestic fevers of various types, and small-pox, are far more fatal than in other places.

If we take a map of Newcastle-upon-Tyne, and shade the undrained part of the town, where, besides cesspools and other abominations, the pavements were rotten and unpaved, it will be found that there the cholera prevailed, and in some instances whole households perished: there fevers, &c., also rage. Those who visited the churches of Newcastle, and saw the large crowds of persons in respectable circumstances who were in mourning, and who knew the families attacked, must admit that it was not the poorness of living to which might be attributed the numerous deaths. No one will deny that poor and insufficient food predisposes to disease; nor can it be doubted that drunkenness and dissipation will have a similar effect; but it must be admitted, that the poor and dissolute are driven into the worst conditions, and that those more affluent, who have been exposed to live in undrained situations, have not escaped. In these attacks it is to be noted that the wealthy fly. In the case just mentioned, many families went to Tynemouth, which, with North Shields, is connected with Newcastle by railway. Gentlemen passed daily from where the cholera was raging, but no cases are known to have been conveyed from one town to another. Tynemouth and North Shields had, at former times, been visited with this disease in a fearful manner. They have, however, been well drained; and as we have already said, the medical officers removed every fragment of filth that was possible before the downright alarm came.

The same was done at the barracks about a mile from Newcastle. Several hundred soldiers and their families communicated freely with the townspeople, but no case of actual cholera occurred. The malaria was evidently visible at both these places, for diarrhœa prevailed to a great extent: it did not, however, assume a malignant form, and yielded to mild treatment.

In looking at the accounts of the treatment of various kinds of illness in former times, at the ignorance of many of those who practised medicine, who shut up fever and small-pox patients in close rooms, forbidding a breath of air to enter, who bled for every disorder, all must see that the improvement of the general health is to be attributed, to a certain extent, to increased skill and intelligence of the medical practitioner, and to vaccination: this is not, however, sufficient to account for the great benefit derived from sanitary operations. It is not from this cause that the gaol fever has disappeared, that other fevers have almost vanished from the model buildings and low lodging-houses, and that, in places where drainage has been made good, and ventilation has been carried out, virulent fevers cease even amongst the very poor.

## EVIDENCE TOUCHING THE ARCHITECTURAL MUSEUM.

WE continue our report of Mr. Scott's evidence:*—

*Chairman.*—Do you think that the advancement of architectural art would be much endangered by the breaking up of your museum?—I think very seriously: it would be worse in some sense than if we had never formed it; because, where an object has never been attempted, people feel that, if they could possibly carry it out, a great public benefit would be effected, and they make efforts to start the thing; but where a thing has been tried and then stopped, you cannot get any one to help you again.

* See page 602, *ante*.

Do you think it likely that that would be the result if it were removed from the South Kensington Museum?—If we should remove it from the South Kensington Museum, and establish the museum on a private footing, we would do all the good we could; but we should be doing less than now, and infinitely less than a public department could do if they would take the matter in hand, and put their shoulder to the wheel.

Your position at South Kensington is that of tenants by leave: it is a question of 150*l.* a year, is it not?—As to the present state of things, we are not satisfied with it: we are going on, on a miserable scale compared with what a national collection should be: we want it to be a grand and magnificent collection, worthy of being called national. The present building will not carry us, but we do not care how homely or ugly the building is in which we are placed: we only want good housing.

You have had space allotted to you in the iron building for three years: have you any remark to make upon that?—It answers the purpose admirably if it would only carry the necessary weight.

Is there anything else you wish to add?—I think that the great object to aim at is, that the Department and our committee should thoroughly compare notes with a wish to aid in carrying out this most important work, as I consider it; and if they were on both sides to meet with that desire we should readily find a way of doing it. I am only throwing out a suggestion of a rough system, but I think that the course which would unite all the advantages, and avoid all the disadvantages, of the two systems of management would be something of this kind;—that we should in the first instance expurgate our museum of those inferior specimens which have been mentioned in the letter before referred to: this we should do by mutual co-operation, because there are a good many things which might look like rubbish to others, but which are of great value, and which we should be the best judges of; but by mutual co-operation we should thoroughly sift the collection, and then make it over on loan to the Department, and they should in future take the management into their own hands, and undertake the expense of increasing the collection from time to time, as may be needful;—that we should still exist as a committee for the purpose, not of increasing that museum, nor of managing it, but of aiding in the uses to be made of it;—that we should still exist as a committee of architects and gentleman taking an interest in art, whose object is to promote the study of the arts connected with architecture among those workmen who are not able to promote it for themselves;—that we should do so by establishing lectures, and by establishing schools for teaching them the practice of their different arts, we bearing all the expense ourselves:—and further, that out of our own body we should elect, from year to year, a small number, perhaps two or three, who would be accepted by the Department as persons who would advise them from time to time as to objects which are wanting, and which they know are capable of being obtained. Those persons would always be ready to offer advice, though the Department should not be bound to follow it where not convenient; but we should by that means communicate to them that experimental knowledge which we possess, but which the Department cannot themselves have. I think that such an arrangement as that of which this is a general outline might readily be brought into a practical form if we were to meet and thoroughly study the thing, and discuss every difficulty that arose, and that it would be the means of founding a really national museum of all schools of architecture. Unquestionably the two great styles which we practise, the Classic and the Gothic, should be those most largely represented: the other styles which we do not practise, the Indian styles, and so on, which are matters of mere erudition and illustration, would be represented merely as luxuries and supernumerary subjects; but the two great styles, Classic and Gothic, with all their branches, should be thoroughly illustrated, with a view not so much to amuse the public, as to aid the workmen in carrying out architectural works.

*Sir John Shelly.*—I understood you to say that the object with which this collection, in the first instance, was got together, was to enable the workmen to learn their art better: did I understand you rightly to say, that you thought the position of the South Kensington Museum not so good as where the Museum was previously?—No: it is more distant for the majority of them.

So far as the removal to the South Kensington Museum is concerned, it has been so far a detriment to the object you have in view?—In a slight degree: it is less convenient, but the men do go all the same.

When you said that, you did not mean it to go to any extent?—No: it is a little inconvenience which must necessarily arise.

Supposing that the result is your being turned out of the South Kensington Museum, what part of London should you say would be the most within the reach of a workman after his work is done in the evening. Would you call the British Museum a central situation?—That is a very good situation.

But is it a central situation do you think?—Yes. It is more within the reach of the workmen than South Kensington no doubt.

As regards the South Kensington Museum you would say, I presume, that the Department there must be the best judges of what they are capable of undertaking, and that it would not do for this committee to recommend them to take in charge an exhibition which they did not think would be of use to them: you must leave that to the discretion of the managers, must you not?—Perhaps so; but it seems hardly possible that a department, instituted to promote the arts of this country should consider architecture to be a branch of art which it is not worth aiding.

You said that you believed, since this collection has been formed, the taste of carvers has been much improved: does that apply to the time when you were in Cannon-row, or previously to your connection with the Kensington Museum, or since?—All the time.

Have lectures been given at the South Kensington Museum?—At both places: we commenced them from the first.

They go on now to this time?—Yes.

With regard to workmen, do you find that the numbers attending the lectures have increased or decreased since the Museum has been at Kensington?—I think they have increased. I think that more have gone to the lectures: that has arisen in part from our feeling that we must take more pains to beat them up. When a particularly practical lecture was about to be given, we have had notices printed, and sent a great number to master builders: when we have done that the numbers have been very considerable indeed; several hundreds.

Do the lectures take place in the evening?—Yes.

Had your lectures previously taken place in the evening?—Yes.

Where did you give the lectures in Cannon-street?—In the loft to which I have referred.

Is there any difficulty in sifting the specimens where they are now?—No; not the least.

*Mr. John Locke.*—You stated that an arrangement might be made between the two bodies if they came together: who do you propose should have the direction as to what should be placed in the Museum?—I suppose that the Department should have the direction, but that we should give them, without bidding them in the least degree to follow it, the benefit of our advice, and that we should give it through a small body appointed by the general committee or agreed upon by some means or other.

Supposing that they did not adopt your advice?—We should say nothing further about it.

Then the Museum would not be improved at all, would it?—If they do not choose to follow our advice; but I should fancy that the two bodies acting with an intention to co-operate, when they had the means of doing so, and there was no particular reason to prevent their doing so, they would follow our advice.

However, up to the present time, it appears that they have objected to a great many specimens of architecture which you have placed in the Museum?—No: they gave us notice to leave originally because of the weakness of the building, but as reasons for not providing for us in any new building, they gave those three reasons which I read. One was that our Museum was chiefly a Gothic collection: the second was that it contained a number of inferior specimens; and the third, that it contained some other specimens which they did not think of a nature to be exhibited.

They have objected to your specimens?—Not to individual specimens.

Still they make that statement that they object to your specimens. Suppose they did that when the new arrangement was made, you would not be able to improve the Museum at all, would you?—If they acted always contrary to us we should find a difficulty; but I do not think that that would take place: in almost all those cases where they might think our specimens inferior, we should probably agree with them: in other cases we should be able to show them that they were mistaken.

Do you think it would be better if a grant were made to you from Government, and you were allowed to carry out your own views?—We should like it; but I do not think, consistently with the way in which these matters are now conducted, we should be likely to get that.

Do you think you could carry out your views more efficiently if that were done?—If a grant were given us, and they gave us a museum, and let us have it all our own way, perhaps we might think so; but it is not a thing which we should like to propose or suggest.

You do not think it would be acceded to?—No.

Suppose it were acceded to, do you think that that would be a better plan?—No: I think that we should lose the nationality of the thing: we should lose more in that direction than we should gain by the fancied advantage of having our own way.

I believe you have had great practice as an architect?—Very extensive.

You stated that you did not care what sort of building this collection was put in: do not you think that an architectural museum ought to have some architectural feature about it?—It seems more consistent, but I would rather have the money spent on specimens for study than on a fine building.

Do not you think that great improvements might be made in the style of the building they are putting up now?—They have aimed at no appearance whatever.

There is no architectural feature about it whatever?—No: their new galleries are good for practical use.

With regard to the exterior of the building, have you ever seen anything more frightful than that new brick building they are erecting at the back?—I have not looked at it; but, supposing that a new building were being erected for their own purposes, not on the site of the present iron building, I believe that the existing iron building, if strengthened to a certain extent, would for many years to come answer all the purposes of the Architectural Museum, and would for a time contain many other things besides. It really is a building well suited for our purposes, if it were strong enough. The court would contain lofty specimens, which we have no room for at present: the side galleries on the ground floor would contain specimens which are heavy but not lofty; and those above would contain light specimens; so that the building, if it were strengthened, would be all which would be wanted for the Architectural Museum for many years to come.

Do not you think that it would be a better plan to have a design upon a large scale for the whole buildings to be placed upon that site, and to carry out that design by degrees?—I should think that probably it would. I hardly know the principle they have been going on hitherto.

Have they been going on upon any principle whatever?—I have never meddled with their business in that way. I see that they have provided a number of picture galleries, which answer their purposes very well.

However, a great expense has been incurred in very inferior buildings?—I suppose that they are partially temporary.

Supposing that a system had been laid down at the commencement for carrying out a building upon a large scale, and that they built that portion, which they had money enough for at the time, and had then gone on by degrees as they wanted room, would not there have been a great saving to the public, and would not it have been a much more ornamental building?—It would have been a saving to the public if you suppose that eventually they must erect such a building. At the same time, I do not know that it would have been better, considering that it was an entirely new institution. It is, I think, better for new institutions that they should begin in a temporary building, and supply their wants bit by bit as they arise.

Nearly all the buildings, as we have heard in evidence, are condemned?—I have not heard the evidence on that subject.

It being a question whether fresh buildings are to be erected there, is not it your opinion that there should be a plan for the whole of the buildings laid down, and that you should build that portion of it which you have money to do at present, and then carry out the building eventually, so as to make a perfect whole of the building which would be fit to be looked at by the public?—I should say that that is or is not the case, according to the answer which might be given to another question. If the Department feel at present that their experience as to their wants is such as to enable them to know for certain what eventually their requirements will be, the best plan would be to construct a permanent building; but it may be that hitherto they have not been able to determine that,—which, in a new establishment, is very probably the case.

Do you know the wants of this Museum at present?—No.

Would those connected with it know?—I should say to a great extent; but the question is, whether they could form a definitive idea of the final requirements.

Could not a plan be made for a building in such a way as to adapt to it the further additions which might be required to be made from time to time, so as to meet the wants of the Museum?—No doubt it could. That building would not be, perhaps, so good as if all the wants were really known before they planned it; but, when they have arrived at a certain degree of experience, no doubt they could plan such a building.

I mean such a building as would be an ornament to South Kensington, and at the same time would be so constructed that from time to time additions might be made to it to meet pressing wants?—No doubt such a building could be planned. If they saw their way to the first block of it clearly, no doubt they could plan that block and add to it afterwards; but whether the building, after it had grown from that first block, would be as good as if it had been planned after some years' further experience, I could not say.

Are you aware that at present they are erecting permanent buildings?—I was not aware of that.

Supposing that they are erecting permanent buildings now, would not it be much better that they should be erected as part of a plan?—If those were considered permanent, I should think it would be better that they should be erected as part of a general plan.

*Chairman.*—Have you any reason to suppose that they are not part of a plan?—Not the least.

*Sir John Shelley.*—You have turned your attention generally to the question of exhibitions, with reference to the wants of the working classes in London as regards architecture: are you of opinion that it is desirable to have one large central exhibition to meet the requirements of London, or are you of opinion that in a place so large as London more than one exhibition is necessary to provide for its wants?—As to architecture, I should think that there should be a central exhibition, but at the same time it would be an exceedingly good thing to have local schools in the metropolis, to which to send out specimens, changing them from time to time, and also in different towns in the country.

Therefore, looking at the object which you had in starting this exhibition originally, namely, the getting the working classes together to see it, do you think that in some way or other it would be advisable that there should be more than one exhibition, so as to meet the particular wants of different localities of the metropolis?—I think that the sending to different localities should be subordinate to a central museum. I think that this system of aiding the education of architectural workmen of different classes throughout the kingdom must come from one heart as it were.

You think that that applies to the metropolis as well as to the country?—Yes.

*Mr. Beamish.*—I presume that you would be in favour of getting a separate grant for all these collections, if you could so manage it?—I am not capable of forming an opinion upon other collections.

Do you think that the metropolis and the country at large derive great advantage from the South Kensington Museum, and do you think that a sufficient space could be afforded there for the different branches of the art?—Yes. As regards other arts than that of architecture I am not so capable of forming an opinion, but I have no doubt that the manufacturing art of this country is benefiting enormously by the South Kensington Museum.

In reference to the arrangement of your particular collections, they have not space for it at present at South Kensington, and they have been obliged to give you notice from that cause: would not your managing committee be perfectly prepared to make arrangements in reason for selecting such portions of the collection for exhibition there which would be satisfactory to your committee and satisfactory also to the managers of the South Kensington Museum?—No doubt: if we went through it with one of their officers we could sift it satisfactorily in a very short time.

You have been asked with regard to a design being laid down originally before they commenced any of their operations: do you believe that if a very large estimate had originally been asked for it, the Museum would have been started?—You would judge of that better than I can. I should think probably not.

It was more prudent till they knew their real wants to go on gradually?—Yes, I think that temporary buildings, in all such cases, are best at first.

*Mr. Joseph Locke.*—Are you aware that those buildings have cost 54,000*l.*?—No.

*Mr. Stirling.*—Have you anything further to add to the remarks which you have made as to the mode or co-operation which you would suggest between the public department and your society for future action?—If I were to go into it, and to lay down a complete prospectus, I might add a great deal more: at present I do not know that I can; but I feel quite convinced that if an officer of the Department, and a representative of our committee were to go into the question with a mutual desire to carry out what would be most beneficial for the public, we should find no difficulty in laying down regulations, and in carrying them out in a satisfactory manner.

*Mr. Blackburn.*—Does not your proposal resolve itself into this, that you want a grant applied in some way to your particular business of architecture?—No, not exactly. As regards ourselves as architects, we must provide for our own education. We are supposed to be in a position in society which enables us to do so, but our workmen are not in such a position: we therefore want facilities of study put in their way, because they cannot provide them for themselves.

Should not architects instruct their own workmen?—We do our utmost, but we cannot provide a great museum: we have done our best by providing this. All we say is, that our best is insufficient.

What assistance do the Department of Science and Art give you at present?—They give us house-room only, which saves us 150*l.* a year.

I see in the list of annual subscriptions, "The Board of Trade, Department of Art, 100*l.*"?—They gave us 100*l.* in 1855: that is the only pecuniary subscription we have ever had from them. That subscription was only for one year.

*Mr. Stirling.*—Did they withdraw it?—Yes; they withdrew it, and gave us house-room instead of it. Most of

those in that list are annual subscribers. Our annual subscriptions last year were 340*l.* We have spent altogether 4,000*l.*: besides having had extensive and valuable donations of casts and other specimens, we have now an enormous mass of most interesting specimens from India, which have been presented to us by Sir Bartle Frere, which are at present in the docks, because we have no room in which to keep them. They are the remains of a city, which, 500 years ago, was destroyed by an earthquake.

## DESCRIPTION OF A NEW PRINCIPLE IN THE APPLICATION OF MALLEABLE IRON TO THE CONSTRUCTION OF BRIDGES.

HAVING, a short time since, had my attention directed to the construction of a bridge which should combine great strength and durability with economy of cost, the result of my consideration of the subject being to recommend a principle of construction, in the application of malleable iron to the purpose, which appears to me to be new, a description of such construction may not be without interest to some of the readers of your valuable serial; and I hand you the conclusions I have come to in the case referred to for insertion, should the same be deemed worthy a place in your columns.

After some consideration of the subject, I came to the conclusion that the use of malleable iron, and a principle of construction which I believe to be new in the application of that material—although the application of cast iron on a somewhat similar principle is not uncommon—would answer all the conditions required.

When I state that my design is a new application of malleable iron to the purpose referred to, I wish such assertion to be understood in the qualified sense of my not being aware of the same principle having hitherto been acted upon, and of my not having met with any suggestion of the application of malleable iron on the same principle to the construction of bridges. Mr. Dempsey, in his book on "Tubular, and other Iron Girder Bridges," p. 1 (Weale's Rudimentary Treatises), alludes to a bridge, said to have been chiefly of wrought iron, as having been invented by Thomas Paine, the political writer, as early as 1787; but not having seen any description of its construction, I am unable to say whether it was, or was not, on the same principle as that which I am about to describe.

The principle of construction adverted to consists of a parabolic arch, in the spandrils of which are struts proceeding from the back of the arch to support a horizontal and longitudinal beam. The bottoms of the struts are connected with the head of the next succeeding one towards the crown by diagonal braces; and from the head of each strut from the springing of the arch is a vertical strut meeting a horizontal piece. These form one of the ribs or trusses of which an arch of a bridge is composed; and any number of which that may be necessary to support any required breadth of roadway are connected by transverse beams or joists notched into the horizontal and longitudinal beam of each rib; the notches being in both the longitudinal and transverse pieces.

The whole of the above-mentioned parts of the arch it is proposed should be of plate-iron.

Besides the transverse beams already spoken of, the ribs are further connected by tie-rods, of malleable iron, through the arched piece, below the junctions of the struts and braces. And, in order to maintain parallelism, these tie-rods should be shouldered at such distances as the ribs are intended to be apart, and secured by nut-screws or taper keys at their ends at the outer sides of two ribs in succession, which each tie-rod connects. It must be understood that, the several sets of tie-rods forming each transverse connection of the whole of the ribs of an arch, one tie-rod connects the first and second, another the second and third, and so on.

The direction of the struts is that of the diameter of curvature at the points in the arch from which the struts, at their mid-breadths, proceed. This direction, it may be remarked, is that of a perpendicular to a tangent to the curve at the point in the arch just mentioned; and the joints in the plates forming the arch should also be in the like direction, whilst those in the struts, braces, and crown-beam may be square or perpendicular to their directions.

The distances of the struts apart from each other should not exceed 9 feet; but any distance within that limit may be adopted that may accord with an equal division of the length of the arch.

The rise of the arch should never be less than one-tenth of its semi-span, which in general will be found to be sufficient; but, under particular circumstances, a greater rise in proportion to the span may be required.

The proper direction of the joints has already been spoken of. The ends of the plates should butt to each other at their joints; and joints may be at any part of any member of a rib, provided a lower portion of a strut and of a brace be in one plate with a portion of the arch piece, and that an upper portion of a strut and of a brace be in the same plate as part of the crown beam. Over every joint there must be a covering plate, extending to a distance on each side of the joint at least equal to the breadth of the plates joined. These covering-plates are to be riveted on one side of the joint, and fastened with screw-bolts and nuts on the other; and wherever two or more plates, arranged parallel to each other, form any part or member of a rib, then between such plates pieces of plate, of a length equal to the breadth of the plates to be joined, and of a sufficient breadth to admit of two rows of rivets, are to be riveted immediately at the extremity of the covering-plates on the side of the joint fastened by bolts.

The transverse beams should be formed of two parallel plates, 6 inches in breadth, and half an inch thick, having wood 2 inches thick, and of the breadth of the beam between them, secured by bolts 18 inches apart, to which to spike deals to form the floor or roadway of the bridge. These transverse beams should be so notched into the crown beams of the ribs, that the backs of the crown beams and those of the transverse beams may be flush.

In bridges for ordinary traffic, the ribs should be 6 feet apart, centre to centre; but for carrying railways, the ribs should be so arranged, that the rails may be immediately above, and in the direction of the ribs. The transverse beams should be 6 feet apart, centre to centre, from each other; and when the bridge is only intended for light traffic, such as foot-passengers, a bridle-road, and roads in pleasure-grounds and farms, these members of the structure may be entirely of timber.

The abutments at the extremities of a bridge on the construction described will be properly of mason work, having the horizontal portion of the rib beyond the springing of the arch resting on cast-iron plates, or in spans of great length, on rollers mounted in strong frames; and the mason-work built up in the intervals between the ribs, leaving spaces for them to fit in loosely.

Should several arches be required to span a river or stream, the piers between the arches may consist of cast-iron columns and plates, on cast-iron screw piles, whenever the bed of the river or stream may be of a nature to admit of their application. If the bed of the river or stream be rock, or of such a nature as not to admit of the use of screw piles, recourse must then be had to stone foundations for the piers.

There should be as many piles in the transverse direction of the piers as there are ribs in the arch, and the piles should not be less than 4 feet in clear distance from each other in the longitudinal direction; so that each end of a rib may rest above a pile. When the piles have been arranged as just spoken of, their heads must be adjusted to a level, not only with each other in the same pier, but also to the level of the other piers. When the heads of all the piles have been adjusted to an exact level at a height of several feet above which the water in the river or stream may be expected, under any circumstances, to rise, there are shouldered cylinders, having one end fitting into the heads of the piles, and the other end passed through cast-iron plates 1½ inch thick, and about 3 feet 6 inches in breadth, to connect them transversely; and plates above the last-mentioned, of similar breadth and thickness, to connect them in the contrary direction; and the remaining length of the cylinder, after having passed through the two plates, to fit into the bores of the cast-iron columns forming the upper part of the piers. The two plates and the base flanges of the columns are then to be firmly bolted together, by means of not less than four screw bolts to each column.

Upon the heads of the columns there should be cast-iron plates similar to those already described as being between the heads of the piles and the feet of the columns; but the connection from the heads of columns through the plates will be unnecessary. The head flanges of the columns, the horizontal plates, and the base of the vertical plate about to be described, should all be firmly bolted together by screw-bolts and nuts. The vertical plates just adverted to should be of the same height as the end of the rib, which must rest on the transverse horizontal plate, and fit loosely into the groove on the vertical side of such upright plate. In order to protect the cast-iron piles from injury, by floating ice and wreck, it will be necessary to have starlings in front of the piers, formed of timber piles, with sheet piling between them. The sides of the piers should also be protected by fenders formed of a timber pile driven between each two cast-iron piles, and strong transverse beams of timber notched into and bolted to such timber piles at 3 feet apart from the bed of the river or stream, upwards. The starlings and side fenders should be of the same height as the cast-iron piles: the starlings should form parabolic curves in their plan: the side fenders should be tangents to the vertices of the parabolas; and the whole should be covered with sheet iron, to prevent abrasion of the timber by floating bodies striking against such defences of the piers during floods.

The sides of the bridge may be fenced at the sides by plain palisadoes, or by an open parapet, ornamented to the taste of the designer. In either case there should be plinths over the piers, surmounted by lamp-posts. The material of the fences will properly be of cast iron, and their height should be 4 feet 6 inches above the level of the roadway.

The floor or roadway of the bridge may be formed of creosoted Baltic deals, 3 inches in thickness, spiked to the transverse beams, covered with a mixture of asphalte and chalk, and lastly with broken stone or gravel, with a small quantity of Portland cement or hot lime washed into such surface with water.

The principle being simple, a bridge may be constructed and erected at a comparatively small cost; and, being composed of pieces of a portable size, it may be constructed and fitted in this country, and then taken to pieces and transported to the colonies and foreign countries, where it may be erected with a trifling amount of labour, and may, therefore, become an important manufacture for export.

The following are suggestions for the dimensions of iron to be used in the construction of bridges for different purposes.

*Foot Bridges.*

| Span of Arch. | Breadth of Plates. | Thickness of Plates. | Number of Plates. | Number of Covering-Plates at Joints. |
|---|---|---|---|---|
| Feet. | Inches. | Inches. | | |
| Under 40 | 4 | ¼ | | |
| Above 40 .. 60 | 5 | ¼ | | |
| — 60 .. 80 | 5½ | ¼ | two.. | one. |
| — 80 .. 100 | 6 | ¼ | | |
| — 100 .. 150 | 6 | ⅜ | | |
| — 150 .. 200 | 6 | ½ | | |

To bridges for light carriage traffic, such as on private roads in pleasure grounds and farm roads, the above scale may be applied; but having three plates, and two covering plates at the joints, instead of two and one respectively.

*Bridges for Heavy Carriage Traffic, such as on Public Roads.*

| Span of Arch. | Breadth of Plates. | Thickness of Plates. | Number of Plates. | Number of Covering-Plates at Joints. |
|---|---|---|---|---|
| Feet. | Inches. | Inches. | | |
| Under 20 | 6 | ¼ | two.. | one. |
| Above 20 .. 30 | 6 | ⅜ | | |
| — 30 .. 50 | 6 | ½ | | |
| — 50 .. 100 | 8 | ½ | three | two. |
| — 100 .. 150 | 10 | ½ | | |
| — 150 .. 200 | 12 | ½ | | |

To bridges for railway traffic the above table may be applied, but with the breadths of the plates and number of covering plates in the arch and crown-beam increased in the proportion of three to two.

The diameters of the rivets and bolts should be two-fifths of their lengths when such proportion exceeds three-eighths of an inch; and their distances apart, centre to centre, may be properly three times their diameter.

The diameter of the tie-rods may vary from one to two inches, according to the strength of the arches they are to connect.

The columns should have parallel sides: their length should not exceed twenty times their external diameter; and their thickness should not be less than 1 inch when the external diameter does not exceed 12 inches, and 1½ inch when above 12 inches.

JOHN EWART.

Newcastle-upon-Tyne.

## SOCIETY OF ARTS EXAMINATIONS.

*Prizes awarded to Candidates*, 1860.

| | | | |
|---|---|---|---|
| Arithmetic .... | 1st Prize .. | £5 | William Vaughan, aged 19, Sussex-hall Evening Classes. Clerk. |
| | 2nd Prize .. | 3 | Michael Shillito, aged 17, Leeds Young Men's Christian Institute. Mechanic. |
| Bookkeeping .. | 1st Prize .. | 5 | Francis Joseph Thomas Moore, aged 25, London Mechanics' Institution. Bookkeeper. |
| | 2nd Prize .. | 3 | Robert Pearce, aged 20, Ipswich Mechanics' Institution. Accountant's Clerk. |
| Algebra..... | 1st Prize .. | 5 | Thomas Hick, aged 19, Leeds Young Men's Christian Institute. Teacher. |
| | 2nd Prize .. | 3 | Joseph William Mills, aged 17, Watt Institute, Portsea. |
| Geometry..... | 1st Prize .. | 5 | Walter Robinson, aged 22, Leeds Young Men's Christian Institute. Mechanic. |
| | 2nd Prize .. | 3 | Charles Herbert Ellerby, aged 18, Manchester Mechanics' Institute. Mechanical Draughtsman. |
| Mensuration .. | ..... | .. | No Prizes awarded.* |
| Trigonometry .. | ..... | .. | No Prizes awarded.* |
| Conic Sections.. | 1st Prize .. | 5 | Hugh Battle, aged 39, Leicester Church of England Institute. Missionary. |
| | | | No Second Prize awarded.† |
| Navigation and Nautical Astronomy .... | ..... | .. | No Prizes awarded.* |
| Principles of Mechanics ..... | ..... | .. | No Prizes awarded.* |
| Practical Mechanics..... | ..... | .. | No Prizes awarded.* |
| Magnetism, Electricity, and Heat .... | 1st Prize .. | 5 | Archibald Simon Lang Macdonald, aged 20, Glasgow Mechanics' Institution. Mercantile Clerk. |
| | 2nd Prize .. | 3 | William Scott, aged 26, London Mechanics' Institution. Inland Revenue Officer. |
| Astronomy .... | ..... | .. | No Prizes awarded.* |
| Chemistry..... | 1st Prize .. | 5 | William Scott, aged 26, London Mechanics' Institute. Inland Revenue Officer. |
| | 2nd Prize .. | 3 | William Croudson Barnish, aged 20, Wigan Mechanics' Institution. Clerk. |
| Animal Physiology ..... | ..... | .. | No Prizes awarded.* |
| Botany ..... | 1st Prize .. | 5 | Alexander McKinlay, aged 19, Glasgow Mechanics' Institution. Solicitor's Clerk. |
| | 2nd Prize .. | 3 | John Gibbs, aged 37, Chelmsford Library and Mechanics' Institution. Woolsorter. |
| Political and Social Economy | ..... | .. | No Prizes awarded.* |
| Geography .... | 1st Prize .. | 5 | John Dix Suggett, aged 17, Lynn Athenæum. Banker's Clerk. |
| | 2nd Prize .. | 3 | Charles Walker, aged 18, York Institute. Telegraph Clerk. |
| English History | 1st Prize .. | 5 | Robert Clark, aged 22, Glasgow Athenæum. Clerk. |
| | 2nd Prize .. | 3 | Joseph Seed Roberts, aged 19, Bradford Mechanics' Institution. Cabinetmaker. |
| English Literature..... | 1st Prize .. | 5 | Henry Simpson, aged 19, Birmingham and Midland Institute. Clerk. |
| | 2nd Prize .. | 3 | Howard Shakespeare Pearson, aged 21, Birmingham and Midland Institute. Stationer. |
| Logic ..... | 1st Prize .. | 5 | Frederic Reeves, aged 19, Messrs. Chance's Library. Glass-cutter. |
| | 2nd Prize .. | 3 | David Bailey, aged 25, Bilston Institution. Schoolmaster. |
| Latin and Roman History ..... | 1st Prize .. | 5 | John Naismith Russell, aged 24, Glasgow Institution. Assistant Teacher. |
| | 2nd Prize .. | 3 | Charles Steer, aged 29, Croydon Literary Institute. Printer. |
| French ..... | 1st Prize .. | 5 | Abraham Shekelton, aged 33, Glasgow Mechanics' Institution. Bookkeeper. |
| | 2nd Prize .. | 3 | Andrew Farm, aged 29, Glasgow Mechanics' Institution. Pattern-drawer. |
| German..... | 1st Prize .. | 5 | Walter Robert Clark, aged 20, Sussex-hall Evening Classes. Clerk. |
| | | | No Second Prize awarded.† |
| Music..... | 1st Prize .. | 5 | William Hugh Smith, aged 24, Glasgow Institution. Clerk. |
| | 2nd Prize .. | 3 | John Walter Asquith, aged 31, Wakefield Mechanics' Institution. Teacher. |

*Prizes to Institutions.*

One prize of 5*l.* to the Sussex Hall Evening Classes, in in respect of candidate William Vaughan, who obtained the first prize in arithmetic.

One prize of 5*l.* to the Leeds Young Men's Christian Institute, in respect of candidate Thomas Hick, who obtained the first prize in algebra.

One prize of 5*l.* to the Leeds Young Men's Christian Institute, in respect of candidate Walter Robinson, who obtained the first prize in geometry.

One prize of 5*l.* to the Glasgow Mechanics' Institution, in respect of candidate Archibald Simon Lang Macdonald, who obtained the first prize in magnetism, electricity, and heat.

One prize of 5*l.* to the London Mechanics' Institution, in respect of candidate William Scott, who obtained the first prize in chemistry.

One prize of 5*l.* to the Glasgow Mechanics' Institution, in respect of candidate Alexander McKinlay, who obtained the first prize in botany.

One prize of 5*l.* to the Glasgow Athenæum, in respect of candidate Robert Clark, who obtained the first prize in English history.

One prize of 5*l.* to the Birmingham and Midland Institute in respect of candidate Henry Simpson, who obtained the first prize in English literature.

One prize of 5*l.* to the Glasgow Institution, in respect of candidate John Naismith Russell, who obtained the first prize in Latin and Roman history.

One prize of 5*l.* to the Glasgow Mechanics' Institution, in respect of Candidate Abraham Shekelton, who obtained the first prize in French.

One prize of 5*l.* to the Sussex Hall Evening Classes, in respect of candidate Walter Robert Clark, who obtained the first prize in German.

One prize of 5*l.* to the Glasgow Institution, in respect of candidate William Hugh Smith, who obtained the first prize in music.

*Prizes to Local Boards.*

The prize of 10*l.* to the Local Board at the Glasgow Mechanics' Institution.

The prize of 8*l.* to the Local Board at Bradford.

The prize of 6*l.* to the Local Board at the Glasgow Institution.

The prize of 4*l.* to the Local Board at the London Mechanics' Institution.

* No candidate obtained a first-class certificate in this subject.
† The candidate standing second in this subject did not obtain a first-class certificate.

## APPOINTMENT OF ENGINEER TO THE LIVERPOOL DOCK BOARD.

MR. JOHN B. HARTLEY, son of the late Mr. Jesse Hartley, the former engineer to the Board, has been unanimously appointed to the same office, which indeed he has, *de facto*, filled for some time previous to and since the death of his father, whose assistant he was. The salary has been fixed at 3,500*l.* per annum, with efficient assistance. Mr. Hartley, it appears, has already suffered in health from the arduous nature of his duties.

## ON ROUND CHURCHES.

THE following is the paper read by the Rev. T. James, at the meeting of the Northampton Architectural Society, reported in our last:—

I fancy that there is no one who has arrived at the first stage of his architectural catechism who would not be able to answer how many round churches there are in England. The four round churches are almost as familiar to us as the seven wise men, or the nine wonders of the world, or any other conventional number of world-wide notorieties, which will always bear a little addition to their sum when critically tested, but which, for a popular lecture, such as this is intended to be, will be found amply sufficient for working purposes.

A *round* church! People will at once go to see that who would pass by a hundred rectangular ones, partly, no doubt, because the form is rare, partly because it is connected with that little bit of archæology which the most modern student has picked up, of the relation of that plan to the Holy Sepulchre, and partly, I think, also, from the circular form in itself commending itself to our love of beauty and completeness, so that from the "round O" that children delight in above all the letters of the alphabet, to the globe which is our world, and to the mightier spheres which circle above us in the vaulted sky, all round things have a peculiar charm for us, symbolising, as they do, that eternity which the heart of man yearns to as his home.

It may be, I think, because the age of imagination has passed away, and that we are become, as most certainly we are, more prosaic, flat, commonplace, square-headed, and unideal, that the round form has evaporated from our architecture, and that we can now seldom catch its vanishing image, except in a Windmill or a Folly.

Men are said by civilization to become less angular, and to have their individual points and peculiarities rounded off by rubbing against their neighbours; and if the architecture of the day is to symbolize the existing state of society (as is a favourite and not very false theory), we might expect to find all our buildings with all their angularities smoothed off, and all projecting points rubbed down to the fashion of most polished circles.

But I believe that it would be truer, both in fact and figure, to say that our polish and smoothness are all surface-work, little more than a glaze of varnish and a thin veneering, and that all the individual crotchets and ugly corners still exist in the inner man as strongly marked as they do in the ground plans of our houses;—the angles, perhaps, a little *canted* off, but no well-rounded, complete character either in our men or in their buildings.

Indeed, it is remarkable that, whereas the old Roman described a perfect character as a smooth and perfect sphere—

"Totus teres, atque rotundus,"

round and tight as a cricket-ball—we moderns should take the most angular block in common use for our image of perfection, and call a good fellow "a regular brick."

That phrase would of itself imply that the day of round buildings has passed away, and yet with them, I think, the most beautiful of all forms, and the most perfect; if, also, the most ambitious.

For who can fancy the daring tower rising on the plain of Shinar other than a round building, tier above tier, reaching unto heaven? What are those round towers of Ireland, and those far more ancient topes and lâts of India, the works of the early Buddhists, but embodiments of the same spirit of aspiration, striving to express its craving after the Eternal and the Infinite by a form at once most lasting and limitless?

The earliest buildings of all nations are their tombs, and these, also, from the same feeling that erected them, are the best preserved. Love of father or mother, love of ancestry, love of child early snatched away, love of the departed, which is even stronger because they *are* departed, the wish to perpetuate the memory of fleeting spirit by enduring matter,—these motives have made our sepulchres the most enduring of our monuments, and those on which the earliest and highest art was bestowed. Leaving out the strange and isolated art of Egypt, the earliest existing tombs of old Greece and Etruria, and of the further North and East, are, for the most part, round; or, at least, domed and vaulted, and so partially in curved lines. I must omit references which I had made to them, and also to that much larger group of later Roman buildings, such as the Pantheon, the Temple of Tivoli, the Tombs of Cecilia Metella, of Augustus, Diocletian's Palace at Spalatro, the Church of San Vito (a tomb of one of the Tossia family), at Rome, and many other buildings in which the round form is distantly developed.

But to come to those circular buildings of which Time has spared both their forms and records, and which are immediately connected with the round Christian tombs, baptisteries, and churches, from which the Holy Sepulchre at Jerusalem and its kindred churches sprung.

I have drawn out a series of circular buildings all to one scale, the ground plans being chiefly taken from Mr. Fergusson's admirable "Hand-Book of Architecture," a book enough of itself to fascinate a reader into a student. This series will enable you to trace the growth of the round tomb, through a variety of phases, into the normal form of round church, such as our English architects adopted.

Passing from the classical period, and taking up the buildings of the Christian era of Constantine, we have the tomb of his mother, Helena, who died in 328; and that of his daughter, Constantia, now known as the Baptistery of St. Agnese. They are both nearly on the same plan. I have drawn that of the tomb of Constantia. You will observe an inner circle of double pillars supporting the central dome, a vaulted circular aisle and a further outer row of pillars, which is broken by the entrance or forum, which extended on both sides in front much farther than I have shown it.

Of the fifth or sixth century is the much larger building (its diameter being 210 feet), now called the Church of S. Stephano Rotundo, at Bologna. The pillars are all taken from older buildings. This was probably a tomb or a baptistery.

In Santi Angeli, at Perugia, we have almost the identical form, though of much smaller diameter (115 feet), and we here see the first additions to the simple round in the forms of the square porches. Up to this point there is nothing to in-

dicate any place set apart for the holy communion. The tomb of the saint, or the font, would occupy the central point; and though, from the tradition of the catacombs, the tomb might also form the altar, yet we find no divergence from the concluding circular wall for eucharistic purposes till we come to the budding chancel of the Baptistery at Nocera dei Pagani (on the road between Rome and Naples), where a small intersecting circle forms a recess, at the entrance of which, or possibly on the chord of the smaller circle, the altar stood. The ground plan of this church, in which the type of our future round churches first comes distinctly out, is singularly like (and it may help you to remember it) that of one of those venerable watches which our fathers delighted to carry in their fobs.

The integral round being once broken, the expansion rapidly increased in various directions, the chancel became yet more developed, and the octagon form, the intervening link between the square and the circle, which had already appeared in the central font, comes out into prominence, sometimes affecting the outer, sometimes the inner arrangement of the building, as is seen in the main ground-plan of St. Vitale at Ravenna, where I have omitted, for the sake of clearness, the accessory chapels, towers, and porches.

I have done the same in the plan of S. Lorenzo, at Milan, where I have retained only the central part of the original plan, which strongly marks the combination of the square with the circle, and the germ of those foliated geometrical forms which in after-times characterized the window tracery and wall panelling of the best epoch in Gothic architecture, but which were for many centuries confined to the ground plans of a series of the smaller class of churches and chapels, closely united, in motive and expression, to the earlier round churches. I give ground plans of the chapels of Planes, in France; Montmajour, near Arles, also in France; and of Ani, in Armenia.

It would be tiresome to give you a mere catalogue (and time would allow no more) of the many existing circular and octagonal baptisteries and churches still existing in Italy, and at rarer intervals in Northern Europe. Fergusson's Handbook, to which I have already referred, and the much larger French work, by Isabelle, on "Edifices Circulaires," though referring chiefly to classic instances, will supply ample examples to those who are inclined to exhaust the subject. The baptisteries of Florence, the Duomo Vecchio of Brescia, Pisa, and Parma, the campanile of Pisa, known as the "Leaning Tower," are familiar to us all, either by the engravings or still more faithful photographs which every traveller brings home with him. All combine, more or less, the rectangular with the circular form, and none of them very much exceed or fall short of the diameter of 100 feet, which may be taken as the average measure of this class of buildings.

It will illustrate better the history of our own churches to direct your attention to the ground-plan of S. Tomaso in Limine, near Bergamo, where the arrangement is almost identical with the original plan of the English examples. Travelling farther north, we arrive at the curious and important church of Aix la Chapelle, in which "more emperors have been crowned, and more important events happened within its walls, than have been witnessed within the walls of any existing church in Christendom." This was built by Charlemagne, and, though overpowered by the accretions of ages, still retains its main features complete. The nave is really a polygon of sixteen sides, but the shortness of each line brings it in effect to the character of a circle. Originally a circular niche, as in the baptistery of Nocera dei Pagani, formed the east end: the present chancel, terminating with a projecting polygonal or many-sided apse, which also has all the general effect of a round, was not erected till the fourteenth century. This church was, no doubt, a sepulchral one, and the parent of many similar buildings in Germany. The churches of Neimeguen and Magdeburg seemed to have followed its type, while that of Petersberg (in Germany) keeps to the true circle, both in choir and apse, and terminates westward with a large square tower. The baptistery at Bonn, which was of the eleventh century, has the rectangular part as a large western porch, instead of being inserted as a choir between the round nave and apse. I notice the hexagonal Chapel of Cobern on the Moselle on account of its rare form, and because, by the kindness of Professor Donaldson, I am able to exhibit very complete scaling drawings, which, in the elevation of vaulting, triforium, and clerestory, give you a good idea of the appearance which your own church of St. Sepulchre must have exhibited in its pristine integrity, though the plan of St. Tomaso, near Bergamo, furnished also by Professor Donaldson, shows this much more clearly. For many of the other ground-plans I have to thank Mr. Irvine, the intelligent clerk of the works at St. Sepulchre's, who carefully notes and preserves every relic of old times that is brought to light by the present alterations.

But it is time that I should say something of the Church of the Holy Sepulchre at Jerusalem, which, though by no means the first of round churches, as I have already shown, was yet the great progenitor of nearly all the round churches of the Middle Ages, and certainly of all our English ones. Mr. Poole's paper has already forestalled me in much which I might say, and into all the controversies on the authenticity of the site I am glad that I am spared from entering. It is enough, for an architectural view, that the pilgrims of the Holy Land, from the fourth century downwards, found a round church, or at least a circular enclosure, built over the reputed tomb of our Lord, and that the Crusaders of the Middle Ages, after that earlier church had been destroyed, still saw a church of the same form, though with many anomalous additions, raised over the same holy spot. It was in fond remembrance of that form, so strange to our insular precedents, that individual knights or religious societies built those memorial round churches, four only of which are left us to the present day.

The Holy Sepulchre itself, in its present state, is a small chapel, of about 26 feet long by 18 feet broad, in the centre of the rotunda, which is itself about 67 feet in diameter, and at the west end of the building. Beyond, to the east (not to complicate a very intricate plan with minor details) is the choir, presbytery, and apse. These are of much later plan than the original design; and of the walls and architectural details very little indeed remains of the older work. A fire, which occurred in 1808, destroyed the greater part of the old landmarks, and what has since been built is in the very worst taste (and one could not go lower) of Russian ecclesiastic architecture. The number of piers in the rotunda is eighteen (probably twelve existed in the original rotunda of Constantine), and the walls are divided in the usual manner, as your own church once was, into three stories, ground floor, triforium, and clerestory. Quaresmius, who wrote, I think, in the seventeenth century, describes the wall of the triforium panelled with sacred subjects in mosaic on a gilt ground, consisting of the prophets Ezekiel, Daniel, and Hosea—the Emperor Constantine, and on the north side the twelve apostles. I mention this as indicating the character of decoration which might be added if our rotunda were ever thoroughly restored. The roof was conical, formed of cedar beams, and the top of the cone was truncated by a circular aperture, open to the sky, which, as in the example of the Pantheon, appears to have been its only opening for the admission of light. Being placed upon a hill of most irregular surface, so great a difference of level existed between the outer soil and the floor of the rotunda, that the entrance door from the street on the western side opened into the triforium of the interior. The piers of the rotunda are in part circular (as ours are), in part square: the arches in this part were round; though traces of a pointed arcade, the work of the Crusaders, still remain in the choir and eastern apse, and a pointed arch doorway at one of the entrances. How this church grew up from the simple tomb hewn in the native rock to the present uncouth conglomeration through ages of persecution and superstition, of good faith and of bad faith—how infidels desolated and defiled it—how emperors and patriarchs restored and sophisticated it,—how Mahomedans and Christians fought over it—and Christians, one with another—how legends and traditions obscured its genuine history—and rival churches and sects overwhelmed its primitive form—till the great fire in 1808 left little but fragments of the old walls remaining—would form a singular and instructive history, but one far too long to be even sketched in here. To us, its interest becomes greatest when, towards the close of the eleventh century, Europe was roused, by the preaching of Peter the Hermit, into that military and religious frenzy which resulted in the Crusades. * * *

It was from this crusading spirit of mingled faith and glory, which took the cross-formed sword-hilt as the symbol of its creed, that the great military monastic orders sprang up which are so intimately connected with our round churches. The earliest was that of the "Brethren of the Holy Trinity," but far conspicuous above this and several smaller societies, were the two great orders, often confounded, but strictly distinct and often antagonistic—1. "The Knights of St. John of Jerusalem;" and 2. "The Knights Templars." *

## THE GREAT PRIZE IN ARCHITECTURE, AT PARIS.

THE "*Concours des Grands Prix d'Architecture*" was on Saturday decided. The subject of the competition for this year is an imperial residence at Nice. It differs from the general style of *grand-prix* programmes, in being rather more practical. It happens that the member of the Academy who this year proposed the subject is M. Lefuel, the private architect of his Majesty the Emperor; and there was some idea of his having to design this residence for him, and this may have influenced his choice. The difficulty this time was not to compose a design of enormous extensions, but to fill up a space of 80 mètres square with all requirements of an imperial residence. An irregular piece of ground was given, surrounded on two sides by the sea, and in the south-eastern parts of the town. It was to be filled up with gardens, sea-baths, lodges, barracks, stables, staircases leading down the cliffs, and port for the imperial yachts. The drawings demanded were—1. A *block plan*, at a scale of 2 millimètres per mètre; 2. A *plan of the palace*, at 12½ millimètres per mètre; 3. An *elevation*, at 2½ centimètres per mètre; 4. A *section*, to the same scale; and 5, 6, and 7. *Two general elevations and section*, to a scale of 2½ millimètres per mètre.

The following is the award:—

*Premier Grand Prix.*—M. Achille Toyau, of Nantes, *atelier* Questel.

*Seconds Grands Prix.*—1. M. Bénard, *atelier* Lebas; 2. M. Guadet, *atelier* André.

## COMPETITIONS.

*Stretford, near Manchester.*—The designs for the new congregational chapel and schools by Messrs. Poulton & Woodman have been accepted.

*Preston Congregational Church and Schools.*—Twenty-three designs were submitted: that by Messrs. Poulton & Woodman, of Reading, was unanimously adopted.

## COCKBURN STREET, EDINBURGH.

THIS new street, projected by the "Edinburgh High-street and Railway Station Access Company," for the purpose mainly of providing a more direct route between the southern part of the town and the railway terminus than is at present afforded by the North Bridge and the Mound, is now in active progress.

The entire line of the street has been for some time cleared of the old houses which occupied it, and the roadway has been formed and opened for foot-passenger traffic. One block of new buildings at the north end of the street, facing Princes-street, and forming the right-hand portion of the view, is now almost completed externally; and the greater portion of the other blocks are commenced, and will be completed in the course of next summer.

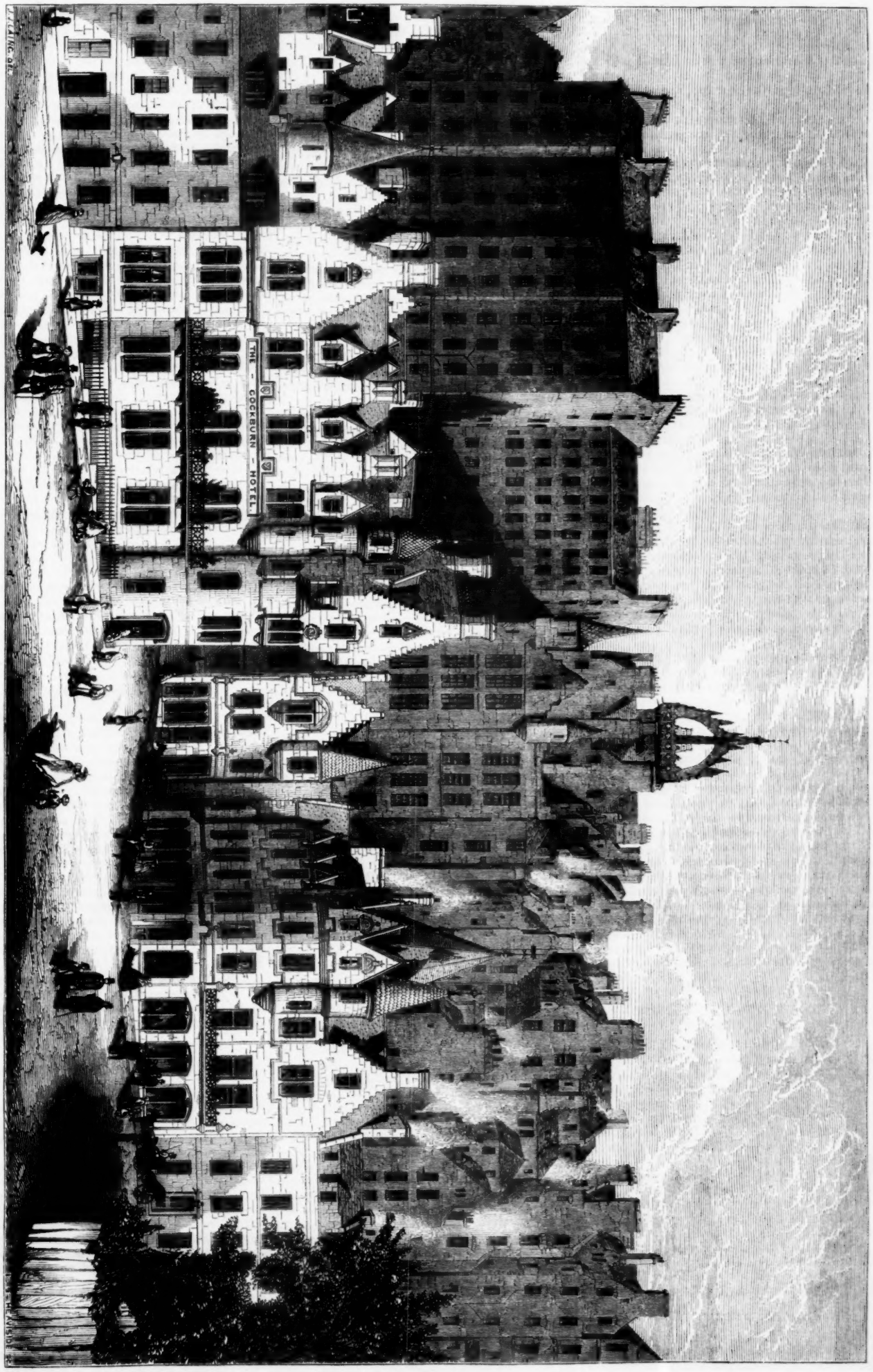
The street opens from the south end of the Waverley-bridge, and, curving in the form of the letter S, winds up to the High-street, which it enters almost opposite Hunter-square. By taking this curved route, the gradient of the street is reduced to one in fourteen, being considerably less than any of the other streets from the railway terminus to the old town.

The buildings to be erected on each side of the street are in the style of those shown in the view,—the old Scottish domestic style, as it prevailed in the sixteenth and seventeenth centuries. The street-floor of the whole of the buildings (except that shown on the left-hand side of the view, which has been designed for an hotel), is devoted to shops, which will be provided with all the modern fittings, many having also large saloons behind, or on the floor above. The proprietors of the *Scotsman* newspaper have purchased from the company a site on the street for large new printing and publishing offices, which are now being erected.

The whole of the buildings in the street are to be erected from the designs of Messrs. Peddie & Kinnear, the Company's architects.

In the background are seen the dark and ancient piles of the High-street, with the spire of the cathedral of St. Giles in the centre. The mass on the left is the Royal Exchange and City Chambers.

* To be continued.




COCKBURN STREET, EDINBURGH.—MESSRS. PEDDIE & KINNEAR, ARCHITECTS.

## THE CHARING-CROSS RAILWAY.

THE company formed for the extension of the railway from London-bridge to Charing-cross had to sustain one of the many fierce parliamentary struggles which have occurred in the history of railways, the principal and most determined opponents being the governors of St. Thomas's Hospital, whose demands for compensation, as it was termed, although no portion of their buildings was to be touched, involved little short of a quarter of a million, and required the entire removal and rebuilding of the hospital at a considerable distance from its present site.

Passengers for the City will be set down at London-bridge, while those going westward will be carried on direct to Charing-cross. The extension will form a junction with the South-Western Railway, and thus complete the link of communication with all the southern lines; and, by means of the South-Western and the bridge at Battersea, access may also be had to the whole of the North-Western and Great Western systems. The line is intended to be constructed on arches throughout its entire length, and they will be so built as to be readily adapted for dwellings, warehouses, or shops. Stations will be provided at each of the roads leading to the Southwark, Blackfriars, and Waterloo Bridges. The amount of local traffic upon these short distances which is expected has been calculated at not less than six millions.

The works, which have been commenced, have been, up to the present time, confined to the bridge across the Thames. A commencement has been made upon the Surrey side of the river by sinking cylinders for the construction of the foundations of the supporting columns. Progress has been made in the construction of the ironwork of the bridge. As at present designed, it will have a roadway for four lines of rails: the two existing piers of Hungerford-bridge will be retained, and six others will be required to carry the structure. The present suspension-bridge has been sold to parties who are about to re-erect it at Clifton; but the new railway bridge will still continue to give accommodation to foot-passengers, by means of projecting footpaths on each side of the railway road. The bridge will be 70 feet in width, and the footpaths on each side 7 feet wide. It will have eight spans of 154 feet each of water-way, and the height of the under side of the bridge, above Trinity high-water mark, will not be less than 25 feet. The width of the river at the point where the bridge crosses is 1,350 feet, and the depth of water at high-tide 30 feet. The bridge will be supported on cast-iron columns, sunk deep into the bed of the Thames. The contractor for the bridge and railway is Mr. George Wythes; but the ironwork of the bridge will be prepared by the Messrs. Cochrane, of Woodside, near Dudley, the same firm who are supplying the ironwork of the Westminster-bridge.

The cost of the line between the London-bridge and Waterloo stations, including land and compensation, and the cost of iron girder bridges over the streets to be crossed, are set down at 464,000*l.*; between Waterloo-road and the south bank of the Thames, 126,000*l.*; the bridge across the Thames, 160,000*l.*: this sum will be exceeded, as there will be four, instead of two, lines of rails, as originally intended; and for the Charing-cross station, including land, compensation, trade, and other matters, 320,000*l.*; making, together, an outlay of 1,070,000*l.*

## THE GOVERNMENT AND RELICS OF ANTIQUITY.

AT the last monthly meeting of the York City Council the Town Clerk read a letter from the Secretary of State, notifying, as we have already stated, "that the Lords Commissioners of the Treasury have been pleased to authorize the payment, to finders of ancient coins, gold or silver ornaments, or other relics of antiquity, in England and Wales, of the actual value of the articles, on the same being delivered up for behoof of the Crown; and I am to request that you will instruct the police officers of your borough to give notice of the intentions of her Majesty's Government, and to inform all persons who shall hereafter make discoveries of any such articles that, on their delivering them to the sheriff, they will receive from the Treasury rewards equal in amount to the full intrinsic value of the articles. In all cases where it shall come to the knowledge of the police that such articles have been found, and that the persons having found them refuse or neglect to deliver them up, Sir George Lewis desires that measures may be taken for their recovery, and that information may be forwarded to him."

Mr. Wilkinson said he thought this was a very unjustifiable proceeding, and one that would tend to injure local collections. He moved that a copy of the letter be forwarded to the council of the Yorkshire Philosophical Society. Mr. Weatherley seconded the motion. Mr. Hargrave said that when this letter was read before the Watch Committee, it was thought that it would be very unwise to adopt the suggestion, and that it would be better for old coins, &c., found in this neighbourhood to be deposited in the Museum, rather than that they should be sent to London. The motion was carried.

## LILLE, FRANCE.

THE intended cathedral has made but small progress: a portion of the crypt, as we mentioned recently, has been completed, and an altar placed in one of the recesses, where Divine service is performed. The piers to support the superstructure are of brick, with stone quoins. Above a few of the clustered columns have been carried to the height of 10 feet.

The large church of St. Maurice is undergoing a complete repair, executed with care of the original decorative portion.

The Museum is being improved: a new gallery is being constructed for the modern pictures. The Wicar Museum of ancient drawings is well arranged, and consists of 1,435 numbers, all framed. The drawings from the sketch-book of Michelangelo are the great feature of the collection. They are in number 198, and, being on both sides of the leaves, are framed between sheets of glass. There is an entirely autograph letter of Francis I., addressed to Michelangelo, expressing his desire to possess some of his sculptures. As his Royal Highness the Prince Consort has sent Mr. Bingham to photograph these drawings, of such high interest to architects, it may be hoped it is for the object of their being circulated among the profession. The Museum also possesses sixty-seven drawings by the divine Raffaelle, some of the highest beauty.

The Chevalier Wicar, who formed the collection, and bequeathed it to his native city, was the agent appointed by the French Directory to collect the *chefs d'œuvre* of art for the Museum of the Louvre.

## BELGIUM.

*Brussels.*—The tower of the Hôtel de Ville has been restored to the base, and all the vacant niches filled with statues. A scaffolding now encloses a portion of the eastern wing for a similar purpose. In consequence of the abolition of the *octroi*, all the gates have been taken away, and the ditch with the dwarf wall removed entirely where the ground is level to permit its being done. Excepting private houses there is nothing being done of architectural character, and these are mostly bare of anything decorative.

The triennal exhibition of the fine arts is now being held in the Palace, erected for the Prince of Orange before the revolution of 1830. The central saloon on the upper floor is the place of honour, and here is Sir E. Landseer's picture "Inundation," which was in the Exhibition of the Royal Academy. The other English pictures are "Past and Present," A. Egg, R.A.; "Titian making his first Attempts in Colour," W. Dyce, R.A.; "Marie Antoinette hearing the Sentence of Death read to her by Fouquier Tinville," E. M. Ward, R.A. These and some few pictures bearing obscurer names, constitute the whole contribution of our school, and have not received very flattering encomiums from the Belgian press.

The total number of pictures, sculptures, drawings, and engravings exhibited are 1,114. All architectural drawings of actual buildings were ineligible, and although a gold medal is to be awarded to architecture, there appears but one candidate for the honour;—M. Joseph Schadde, of Antwerp, being the solitary exhibitor of six designs for Village Churches,—four of Byzantine and two of Gothic, all remarkable for plainness even to poverty, probably to meet the limited funds allowed for their erection.

The pictures of the Belgian school are of pleasing character, without much ideality, when of moderate dimensions; while the larger canvasses, on which some artists portray sacred or historical subjects, are of very mediocre quality. The best of the Belgian school fail to exhibit, and there are no pictures by Wappers, Gallait, De Keyzer, Leys, and others. The German school is well represented, and the French school also tolerably.

*Courtrai.*—The town-hall, which contains the two chimneypieces so familiar to us by L. Haghe's lithographs, has been completely repaired, and the original design throughout restored.

## NEWS FROM AMERICA.

THE State Lunatic Asylum recently erected in New Jersey, on a commanding site near the banks of the Delaware, is an important structure, with a façade of 750 feet in length. A hexastyle Tuscan portico, surmounted by a dome, occupies a central position, and the wings are finished with *campanilè* open on all sides. The internal arrangements are very comprehensive, the main building being chiefly occupied by reception-rooms, chapel, apartments for the officers, with culinary offices in the basement; the right wing arranged for male patients, and the left for females. Accommodation is also provided for the quieter and more convalescent patients, distinctly separate from the refractory; and each ward has its own dining and bath-rooms, &c., those for the better classes having a spacious entrance, half-carpeted, and a parlour handsomely furnished. A lift apparatus conveys the provisions from the basement to the several departments; and the building throughout is heated by steam and lighted with gas. Each apartment has its air-flues communicating with upright foul-air shafts. Heated air is forced into air-chambers by means of a large fan, situated at the end of a tunnel some 350 feet in length. The washing is done by steam, and so is much of the ironing and the cooking.

A new hall is proposed to be built at Tammany. The hotel built by the Tammany Society, and the first opened on the European plan, has received two additions since first erected, and occupies an area of 83 feet by 57.

The total increase in the valuation of Boston this year is 12,910,900 dollars beyond the preceding year; and the rate of taxation on each thousand, 9·30 dollars. Last year it was 9·70 dollars.

The monument at Burlington commemorative of Ethan Alan has been erected. It consists of a round shaft of Vermont granite, 60 feet high, resting on a square pedestal, and with a suitable inscription.

The recently-furnished returns of the Treasury Department, New York, show that the value of hardware imported from England to this country during the year ending June 30th amounted to 14,048,896 dollars, of which 2,274,032 were for railroad iron; 2,150,625 for various iron manufactures; 1,185,441 for bar iron, and 1,049,200 for pig iron. Scotch pig iron is in fair request, and English bar inactive.

As a sign of returning prosperity, it is remarked, that most of the locomotive building establishments which survived the storm of 1857 are now in full and profitable operation.

The improvements now in progress at Canal-street, New Orleans, will, it is said, cause it to be the most magnificent street in the *world*, the length being *eight miles*, extending from Mississippi river to Lake Pourhartrain, and nearly 200 feet wide, with a parterre promenade in the centre, of 40 feet in width. At all the crossings are to be monuments or fountains. Clay's monument has been erected, and that to Fulton is being proceeded with.

## GOVERNMENT OFFICES, OTTAWA, CANADA WEST.

THE building for Government offices, at Ottawa, of which the corner stone was laid by H.R.H. the Prince of Wales, on September 1st, is similar in character to the buildings in the same city of which we gave an engraving on a former occasion, presenting towers, metal crestings, parti-coloured arches, and high roofs. There are two blocks of equal size, though differing in design. They contain all the offices of the various departments of the Government service, together with rooms for the governor-general and his staff and the executive council. There are upwards of 300 rooms with corridors, safes, record-rooms, &c., and the buildings are grouped together, forming three sides of a quadrangle, 800 feet square; the area to be laid out with walks, shrubberies, and fountains. The architects are Messrs. Stent & Laver, to whom was awarded the first prize in October last.

THE GREAT EASTERN AND MR. SCOTT RUSSELL.—It is stated that the directors of the Great Ship Company intend to appeal against the award of 17,000*l.* or 18,000*l.* made by the arbitrators in favour of Mr. J. Scott Russell, who is said to have previously received some 14,000*l.* in excess of the contract price.

## ELECTRIC TELEGRAPH IN INDIA.

THE telegraph which crosses the Kistna river, at Bezwarrah, in the Madras Presidency, is a galvanized iron-wire rope, 1¾ inch circumference, and weighing, per foot lineal, 6¼ ounces. It consists of three ropes twisted together: each rope has seven strands or wires, 1-16th of an inch in diameter. It is carried from rock to rock, and fastened to large posts of teak wood, built into the rock at about 400 feet above the surface of the water. The distance between the two points of support is *six thousand feet*, without any intermediate connection or support. It forms a beautiful curve, and at its lowest point is about 60 feet above the river. It has now been up more than twelve months, and the communication is very perfect.

The ordinary telegraph wire is 3-16ths of an inch in diameter, and weighs per foot run, 3¼ oz. It is all galvanized.

EDWIN E. MERRALE, C.E.

## IRELAND.

THE War Department require tenders for the erection of latrines at Birr barracks, in the Curragh district.

The Port of Dublin Corporation are seeking contractors for the erection of a beacon on the Alderman Rocks, Crookhaven, co. Cork, and a lighthouse tower on the Calf Rock, westward of Dursey Sound, co. Cork: time extended to 31st October.

A branch bank and manager's residence are to be erected at Ennis, for the Provincial Banking Company, according to plans by Mr. W. Murray, architect.

A new hotel is to be built at Bray, co. Wicklow, by the Dublin and Wicklow Railway Company. Mr. Wilkinson is, we believe, the architect. We desire to note the rapid improvement of this now favourite suburban locality. Building ground, not long since disregarded for its undesirability, brings large prices: a new town is rapidly springing up: important projects under Mr. Dargan's auspices are being matured: the Turkish baths recently erected are in working order: a new harbour is in contemplation; and dwelling-houses of various classes and designs are numerically increasing, in a proportion not exceeded in the metropolis.

St. Andrew's Church, Dublin, has been recently partly restored;—the mural monuments that had been covered with plaster are brought to view; the old Norman font (A.D. 1194) is placed within the church; the recumbent effigies of the Earl of Portlester and his wife, and of a bishop of Kildare, previously exposed to the weather, are now under cover; the chancel window is filled in with stained glass; the tottering and unsightly vestry removed. It is further proposed (when funds permit) to re-roof the portions of the old buildings still uncovered, to save from utter ruin the clustered shaft pillars in the graveyard, and to effect various other desirable objects. In an appeal for pecuniary assistance, the committee remind the public that "this ancient church dates from Anglo-Norman times, and, if restored, would exhibit one of the choicest specimens of the architecture of the period, as attested by the monumental brasses, mouldering statues, and time-worn inscriptions, &c., &c., therein."

The report of the County Surveyors of Ireland states that, "though another year has elapsed, and the objects of the body still remain unattained, a powerful expression of opinion has been evoked, and a bill brought into Parliament, with a view of improving the position of the office." Further, that "the Committee entertain sanguine hopes that the subject will come before Parliament early in the next session, and an Act be obtained by the Government in redress of claims."

The new church of the Assumption at Wexford has been consecrated. It is almost identical with that of "the Immaculate Conception," at the north end of the town. The style is Decorated Gothic, and the plan comprises nave, chancel, and side aisles, with tower at western end, surmounted by a spire, attaining an altitude of 220 feet. Dimensions of church—150 feet in length, by 80 in width, including the aisles, which are separated from nave by an arcade of pointed arches, springing from cut stone piers with moulded capitals. The roof is of open timber-work, chamfered, stained, and varnished. Coupled mullioned windows in the flanks, and great windows at the east and west end, light the church; several being filled in with stained glass, representing various subjects. The altar in the chapel of the Blessed Virgin is the gift of Mr. J. T. Devereux. A richly-carved oaken organ-gallery is placed at the western extremity of the church. The material for walling is red conglomerate, with granite dressings. We believe this church was originally designed by Mr. Pugin, but has been carried out under the superintendence of Mr. J. J. McCarthy, architect.

A new line of railway from Bird-hill to Nenagh, in connection with the Limerick and Castleconnell line, is projected, and will be about 12 English miles in length, at a probable expense of 5,000*l.* per mile.

## CHURCH-BUILDING NEWS.

*Milton-next-Sittingbourne.*—The new Congregational chapel recently erected here has been opened. The estimated cost of the chapel, which was built by Mr. Naylar, of Rochester, will be nearly 1,200*l.*, besides the materials of the old chapel.

*Hastings and St. Leonards.*—The foundation stone of the church of St. Matthew has been laid. The building is situated in the parish of St. Leonard, and about midway between Bohemia and Tivoli. The design is by Mr. Voysey, architect, St. Leonards. The contract is taken by Mr. George Edwards, of Luton, Bedfordshire. The building is to be of brick, with stucco facings, and will be 55 feet long by 27 feet wide, and accommodate 300 persons. The ground was given by the Rev. J. T. Cumberlege, and the building will be erected at his own private expense.

*Ilton.*—The church of Ilton, near Ilminster, has been re-opened. The interior has been restored, except the transept, which belongs to Mr. Hull, of Ilminster, who has promised to divest it, during the next spring, of the coats of whitewash which now "adorn" it. The window in this part is filled with stained glass. The nave and north aisle have been re-pewed with seats of deal, stained. There has also been a new ceiling to the nave, divided into panels by moulded ribs, and the oak moulded ribs of the aisle roof, which were concealed with plaster, have been exposed to view, repaired, and cleaned. The Ham stone piers and arches have also been repaired and cleaned, and the walls re-stuccoed. The old oak pulpit has been cleansed from its numerous coats of paint, altered somewhat in shape and height, and fixed on a Ham stone base. The approach to it is through a small octagonal vestry, which has been thrown out on the south side, in the corner formed by the chancel and transept. The chancel has been rebuilt, and is separated from the nave by a low screen of Bath stone, with a pair of gates, made of iron and brass. The chancel, also, has a new ceiling of the same character as that of the nave, and with carved flowers at the intersections. The east wall, as high as the level of the sill of the window, is covered with Minton's tiles. The part over the communion-table is covered with glazed and enamelled tiling of various colours, and with the Canterbury tile on each side. In the centre is painted a vesica with a cross bearing the sacred monogram in colours and gold, and immediately above this is painted, in Mediæval letters, the text, "Whoso eateth my flesh and drinketh my blood hath eternal life, and I will raise him up at the last day." The chancel is filled with two rows of oak seats, placed stall-wise on each side, the front ones having moveable book-stands. The whole are finished with carved poppy-heads, some carved foliage, and trefoil panelling immediately under the book-board, and cut and moulded bench ends. The floor is laid with Maw's encaustic tiles, that portion inside the communion rails being of geometric mosaic work. A new north aisle has been added to the chancel, from which it is separated by two arches of Ham stone, filled in with a light open oak screen, having some wrought-iron work in each compartment, and finished by a light iron cresting, the whole being relieved by having the leaves, &c., gilt. This was made by Messrs. Wightman & Denning, of Chard. The two-light window on the north side has been filled with stained glass by O'Connor, of London. The subjects are Samuel and Eli, and Jesus Christ as the Good Shepherd. This window has been put in by the vicar. It is intended at a future time to fill the east and south windows with stained glass. The whole of the work has been carried out from the designs and under the superintendence of Mr. J. M. Allen, of Crewkerne, architect. Mr. Munden, of Ilminster, was the builder. The Ham-hill stonework was from the quarries of Mr. Joseph Staple, of Stoke, who presented the Bath-stone screen. The Caen stone monument, erected to the memory of the vicar's sister-in-law, was executed by Mr. H. Davis, of Taunton. The sum expended amounts to upwards of 750*l.*

*Yeovil.*—The new cemetery at Yeovil has been consecrated. The site is on the Preston road, immediately facing Ram Park, and about a mile from the borough. The grounds are entered by a pair of gates of oak and iron. There is an entrance-lodge on the left side, built in a style appropriate to the architecture of the chapels, which are approached from the lodge by a gravelled walk about 12 feet wide. These are built in the Italian Gothic style, of Yeovil stone, with Hamhill stone dressings, and each chapel will accommodate about fifty persons. There are two entrances to each chapel, one by an open porch which was intended to be the approach from a central tower, included in the design of the architect. This tower has not been built, from want of funds, but the foundations are laid. There is a stone central turret on each chapel. These turrets are about 30 feet high, and are carried up on four ribs springing from four columns, which rise from the interior of the chapels. The chapels are paved with tiles, inlaid with a mixture of Hamhill stone and stone from the Pisbury quarries, near Langport. The windows are filled with ornamental glass. A little more than eight acres and a quarter of ground were purchased for the cemetery for 1,050*l.* About four acres only, however, have at present been set apart—in equal portions between the Church and the Dissenters—for the purposes of burial. The cost of the chapels was about 3,000*l.* The sums thus expended were borrowed by the town council of the West of England Insurance Company, on the security of the rates for the next twenty years. The architect was Mr. R. H. Shout, of London. The building was entrusted to Mr. Wellspring, of Dorchester, and he has completed his contract. The clerk of the works was Mr. Sansom.

*Ottery (South Devon).*—Talaton Church, near Ottery, was reopened on the 5th. The edifice, having become ruinous, has been rebuilt, with the exception of the tower, which is a curious example of the Perpendicular style, there being seven or eight niches with saints and evangelists on the upper stage and stair turret. The old woodwork, as far as practicable, has been reconstructed in seating and roofs, and a small new aisle added, to compensate for the west galleries removed. Not the least interesting feature of the restoration is the re-erection of a third-pointed rood-screen, repaired with much labour by Mr. Ship, carver, Bristol, at the expense of the present rector, the Rev. C. A. Hoggan. There are five painted windows, by Mr. Hughes, memorials to the late rector and Mr. J. P. Mathew. There is a rich oak pulpit, also by Ship. The church is covered with lead. The outlay is about 1,500*l.* Mr. Ashworth, of Exeter, is the architect, and the contractor Mr. Digby, of Ottery St. Mary.

*Llandaff.*—The *Bristol Times* states that Mr. D. G. Rosetti is executing for Llandaff Cathedral an altar-piece, a triptych. In the centre compartment is the Virgin, with her new-born infant in the manger. A kneeling angel presents a kneeling king and a kneeling shepherd, a ring of angels looking on the manger from the outside. On the left side is the youthful David preparing to fight Goliah; on the right, David in manhood, and a king, in the costume of a Mediæval knight, playing his harp. The whole triptych measures about five feet high by nine feet long. The restoration of the edifice is progressing, and the dean and chapter have resolved to purchase a powerful organ, and have agreed with Messrs. Gray & Davison, of London, for one at a cost of 900*l.* Sir Frederick Gore Ousley, regius professor of music, at Oxford, has been consulted as to its construction. The organ-fund, however, is considerably short of the required amount.

*Northallerton.*—West Rownton Church, near Northallerton, which possesses a fine Norman chancel arch and Norman doorway, has been restored under the superintendence of Mr. Pritchett, architect, and was re-opened by the Dean of York.

## STAINED GLASS.

*Romsey.*—Another stained glass window has been put up in the Abbey Church. It is the east window of the south-east side chapel. The subject, the Epiphany, was chosen for it, because the birthday of the person in whose memory it is put up fell on that festival, January 6. It was executed by Mr. O'Connor, the artist who made the three other windows already in the Abbey. At the bottom of the window, in the glass, is this inscription:—"To the glory of God, and the beloved memory of Elizabeth Painter, who was for 55 years a friend and servant in the family of the Hon. and Rev. Gerard Noel. She died December

15, 1859." The window is given by Mrs. Noel and Miss Caroline Noel, with other members and friends of the family.

*Harpurhey.*—Messrs. Edmundson and Son, of Manchester, have inserted a stained glass window in Christ Church, Harpurhey. The window is canopied, and consists of geometrical tracery. It appears to be placed to the memory of Jane Cheeseright. The window has been presented to the church by a near relative of the rector, in memory of his deceased wife.

*Shipley.*—The painted window in the chancel of Shipley church has just been completed by filling up the seven vacant lower compartments. There are now placed under fretted Gothic canopies full-length figures of our Saviour, St. John, St. Peter, St. James, St. Thomas, St. Andrew, St. James the Less, and (those now added) St. Matthias, St. Simon, St. Philip, St. Paul, St. Bartholomew, St. Jude, and St. Barnabas, the whole surmounted with the figures of the four Evangelists. Besides, nine smaller spaces are filled with scenes from our Lord's history, namely, the Annunciation, Nativity, Presentation in the Temple, Disputing with the Doctors, the Crucifixion, Entombment, Resurrection, and Ascension. There are in the smaller lights in the upper portion of the window various devices represented. The work was done by Mr. Francis Barnett, of Leith. The total cost of the window exceeds 300*l.*, 100*l.* of which has been expended in the last executed portion of it. This 100*l.*, as well as the expense (300*l.*) of purchasing and laying out a new cemetery, was raised by means of a bazaar lately held in Shipley.

*Worcester.*—It may be remembered, by some who took an interest in the subject (says the *Worcester Chronicle*), that, on occasion of the commission for filling a portion of the great east window of the Cathedral with stained glass being entrusted to Mr. Hardman of Birmingham, a Roman Catholic, without affording any chance of competition to Protestant talent, local or general, a correspondent of this paper stigmatised the procedure as something "like a job." When tenders were invited for the memorial window to the late Queen Adelaide by a committee, headed by the lord-lieutenant of the county, Roman Catholics were, as we thought very illiberally, excluded from the competition. To compensate we suppose for this piece of paltry narrow-mindedness, the committee, deputed to manage or assuming the management of the citizens' memorial window, jumped to the opposite extreme and assigned its erection off-hand to a Roman Catholic, without inviting competition to see whether Mr. Hardman might not be surpassed in excellence and cheapness. The window is now filled in, as far as the means of doing so at present extend. It is (continues the *Chronicle*), in every sense of the word, a great disappointment. The window is Early English, with five lights, and is divided across the middle into two distinct portions by the masonry. The coloured glass fills the five lights in the upper division, and the centre light in the lower, leaving four of the lower lights yet to be filled. In providing a design for this east window the artist ought to have taken into account the principal locality from which it is to be seen. The choir, in which divine service is daily performed, is the place where the visitors to the building are gathered together, and the design ought to have been such that its principal features should be distinctly observable from that part of the edifice. We would defy the keenest-sighted person to stand at the extreme east of the choir and discover what is meant by the window. Its leading characteristics are blueness in colour and haziness of outline. With a view of modifying this sensation somewhat, we obtained access to the Lady Chapel. Here we found it necessary to go pretty close to make out the subjects attempted to be illustrated. Judging by those in the lowest medallions, the scenes represented were the chief events in the life of Christ, but it was impossible to discover with readiness what was intended by the artist. The limbs of the various figures are covered with ridges of muscle running in nearly parallel lines from end to end, and the faces are so deeply furrowed as to resemble the tattooed visages of New Zealanders. Two men walking in front of the Saviour are so drawn that one appears to have four legs, and to have the other's head growing out of his side in a most impossible manner. A female figure, with flesh of the most cadaverous hue, follows the Saviour. Whoever has had the good fortune to see in the Portland Gallery Miss Florence Caxton's "Choice of Paris, an Idyll," wherein the pre-Raphaelites are so smartly satirised, with the ridges and furrows of muscle, the strained or impossible attitudes, the distorted visages, and general air of caricature there displayed, has seen nothing more *bizarre* or extravagant than appears in this medallion. The picture, by the ridiculous attitudes of the figures, might have been intended to throw mockery upon one of the most solemn and touching events in the history of our Lord, and we protest earnestly against the introduction of such grotesque Mediæval foolery into a representation of that scene which the Christian Church for eighteen hundred years has regarded with sorrow, veneration, and awe.

*Rugby.*—The large wheel window in the new church at Rugby has lately been filled with stained glass by Mr. Holland, of Warwick, with subjects showing parables of our Saviour, viz., the Good Samaritan, Good Shepherd, Prodigal Son, Labourers in the Vineyard, Lost Sheep, Marriage Feast, Dives and Lazarus; as also angels bearing scrolls.

*Leamington Priors.*—Three windows have just been fixed in Upton church by Mr. Holland, of Warwick, with the following subjects:—one three-light window, Christ Blessing Little Children, and the Acts of Charity in four subjects; one two-light window, Raising the Widow's Son, Healing the Sick; one single-light, of the Ascension.

## FULLER'S EARTH.

NUTFIELD, a village to the west of Tillburstonhill, on the road to Reigate, has long been celebrated for the fuller's earth which has been for centuries dug up in the neighbourhood. The beds of the fuller's earth are dug from the top of the lowermost division of the Shanklin Sand, and occupy a line on the north side of a ridge that extends from the east of Nutfield nearly to Redstone-hill, on the west of Copyhold-farm: about two miles west of Nutfield, the earth was extracted from a stratum 6 or 7 feet thick.

In some of the pits there are two kinds of fuller's earth, one of an ocherous yellow colour, and another of a slaty grey.

The kinds of fuller's earth above mentioned are used for distinct purposes. The blue or slate-coloured is chiefly sent to Leeds and other parts of Yorkshire, where the finest cloth is made. The yellow earth has a much wider distribution, and is employed in the manufacture of every description of coarse woollen goods. It is not only in request over the West Riding of Yorkshire, but also in Lancashire, Cumberland, and Westmoreland. Some is sent into Scotland and North Wales. Norwich also receives a supply for its stuff manufacture. In some coarse goods a portion of the earth is left in the fabric, to give it substance. The whole of the earth exported from this neighbourhood is sent from London by sea, except a small quantity retained by the dyers and scourers. The district yielding the fuller's earth, which had been explored in 1841, was about two miles in length from east to west, and a quarter of a mile in breadth. The quantity of earth raised from the pits is about 6,000 tons annually, of which 4,000 are of the yellow colour.

## "THE BUILDER'S" LAW NOTES.

*Portsmouth Barracks.*—By a recent Act of Parliament, the public right of way through Colewort Barracks, in Portsmouth, has been extinguished, as it was found to be injurious to military discipline.

*Manchester Cathedral.*—By a recent Act, the Ecclesiastical Commissioners are empowered to expend (or to authorize the Dean and Canon of Manchester to expend), in the necessary restoration or repair of the Manchester Cathedral or Collegiate Church, as much of the money paid to such Commissioners before the 1st January, 1860, under the Manchester Parish Division Act of 1850, as they shall deem fit; but the maintenance and future repair of the Cathedral are to be as by the said Act of 1850 is prescribed.

## CURIOUS SMOKE-VENTS IN MILLOM CASTLE, CUMBERLAND.

A WRITER in *Notes and Queries* says,—On my last visit to the ruins of Millom Castle, about half a mile from the estuary of the Duddon, I observed (what had on several previous visits escaped my notice), a curious smoke-vent in the room, which had evidently been the great hall, and which is entered from the small court by a doorway, surmounted by a beautiful flamboyant arch. This vent is a hole of a shape nearly elliptical, the vertical axis measuring perhaps a foot, and the horizontal one about 8 inches (I speak from guess), cut through the wall, which is there some 5 feet thick, at an inclination of about 30 degrees to the horizon. This hole was so very much like what I have sometimes seen in a village church, made to carry outside an iron tube passing from a stove, and then forming a chimney, that I at first fancied this might have been an early instance of this more useful than ornamental contrivance. On examining the outside, however, I found sufficient proof that this was not the case. The hole itself has evidently been the whole and sole chimney, as is proved by its being there bordered by a frame of cut stone surmounted by an ornamental finish (I fear my architectural nomenclature is very imperfect), all evidently of the same date with the building itself. Do any of your numerous readers know of any similar instance? Perhaps some of them may wish to examine for themselves this ancient smoke-vent, which I have attempted to describe. If so, I think they will thank me for pointing out the best way to get to the spot. If the intending visitor will take a tourist ticket to Coniston, such as are issued at the principal stations of the London and North-Western, the Great Northern, and the Midland Railways, available for a calendar month, at very moderate fares, he will find that he is at liberty to stop on the way at any of the stations between Caraforth and Coniston, and afterwards resume his journey at his pleasure. Let him then stop at Foxfield station, and ask for a ticket for Green-road. Then he will be directed to the Green, where he will find an unpretending but very clean and comfortable village inn. From this he can proceed by a very good road, affording views of most picturesque and varied scenery, the lake mountains, Scawfell, the Old Man, High-street, Hill Bell, &c., behind; the open sea in front; the Duddon estuary on the left, and Black Comb on the right. The distance is between two and three miles. Having examined the ruins of the castle, he will proceed to the church close by, which has been lately restored in very creditable style, considering the small amount of funds. He will notice a handsome Norman doorway now re-opened, a piscina window, a drawing of which appeared a year or two ago in the *Illustrated London News*, and in the interior some monuments of former Lords of Millom, among which are two wooden effigies, such as I have seen mentioned in the pages of *Notes and Queries*. There is a Druidical circle, nearly perfect, about two miles and a half from the Green in a different direction; and the foot of Black Comb (the view from which on a clear day is said to be the most extensive in England, embracing parts of Wales and Scotland and the Isle of Man, and occasionally, though rarely, of Ireland), is about three miles from the Green.

## THE DONKEY-TRAP CRUELTY.

IN the *Builder* of March 10, p. 159, an appeal was made on behalf of the poor donkeys whose feet are so frequently trapped by the street water-plugs. All that was then stated has been repeatedly confirmed; but the undermentioned case has been brought to the notice of the magistrate of Lambeth, and deserves the utmost publicity. It seems that the suggestion in the paragraph to cover these holes has been adopted by the Lambeth Vestry, but the Water Company has neglected to comply with the order. Only a donkey, shareholders, tortured and killed by your negligence, whose distressed owner your officials laughed at! Your petted pony may not meet a better fate. At the police court, according to the published report,—

The applicant said that, while he was driving his donkey along the street, one of its hind legs dropped into a water-plug, and snapped in two, so that he was obliged to have the animal killed on the spot. On inquiry he found that the Lambeth Vestry had given orders for these plug-holes to be *covered*; but the Company had neglected to do so, and he wished to know how to proceed against them.

He had made application to the Water Company, but they only laughed at him, and said the donkey wasn't properly shod; but he went to the slaughter-house and obtained the hoof of the donkey to show that it was. The hole is 3½ inches across, and quite big enough to admit the leg of a good-sized pony.

Mr. Elliott advised the applicant to make another application to the secretary of the Company, and in the mean time he would look over the Act of Parliament to see how he could assist him.

Independently of the suffering of the poor donkey, the loss of such an animal to a costermonger may be more than he would recover for a year; and who shall estimate the distress to his family that may result from it? Costermongers are a most industrious, hardworking class; and, while you are building *social bridges* to enable them to cross the sloughs through which they have to struggle, care should be taken that their efforts are not thwarted by the negligence of parish authorities or the penuriousness of joint-stock companies.

J. B.

## CONDENSATION OF MOISTURE ON GLASS.

THE inquiries of "G. W." on the "Condensation of Moisture on Glass" have been answered by yourself in principle, in recommending a "good system of ventilation;" but, if you deem it worth your notice, I would beg to bring before you a plan I have tried, and found to succeed to a considerable extent, and which I think will realize my expectations when the building is well dried out; for, when it is occupied for some time, the amount of evaporation usual in drawing-rooms will not be so great as that which takes place from new walls.

An air-flue, built parallel to the fire-flue, having an opening between the ceiling and floor of each story, takes up the vitiated and humid atmosphere through apertures dexterously concealed by the centre enrichments. I intend to extend this treatment in another case to the cornices, by forming them so as to admit of it, particularly at the inner angles.

I need scarcely mention, the above flue is carried from the ground *joists* as well, and by drawing air from the ventilation in the base keeps the same in a perfect state. X. Y.

A correspondent of yours wishes to know how to get rid of the condensed water from window sashes, so I will let him know of a plan which I have lately adopted with success. I have the top edge of the bottom sash bead sloped off towards the sash. The water, which always runs over this bead, and down the paint and paper, now runs between the bead and the sash, and so outside the window. But when the sash fits close to the bead, then I have a small piece cut out of the former, so as to let the water escape from the channel which has been formed. This plan of mine also answers for casements which open outwards. G. T.

## PATENTS IN CONNECTION WITH BUILDING.*

ARTIFICIAL MARBLES.—*R. C. Videgrain*, Rue Laffitte, Paris. Dated January 6, 1860.—1. Iron rendered inoxidable in bars, or in strips. 2. Sulphate of lime. 3. Lime. 4. Ochres of all kinds. 5. Wood and coal ashes, mixed (these substances must be employed more particularly in marbles intended to bear great heat, such as chimneypieces). 6. Alum powdered at the time of mixing, being put in a furnace and reduced to powder with alabaster or plaster. The liquids used to mix with the powder to render them into a paste are:—1. Aluminous ferruginous water. 2. gum water. 3. Silicate of potash water. 4. A small quantity of rectified sulphuric acid (about 1 pint to 150 pints of water). The proportion of the various liquids must vary according to the object to be obtained. The principal point to be observed is, that the paste be thoroughly kneaded, and of a complete homogeneity.

LOCKS FOR DOORS.—*J. Fowler*, Waterford, Ireland. A communication. Dated January 6, 1860.—For the purposes of this invention the locks are formed to admit of the key at opposite sides, though at different parts of the lock, so that the opening for the key on the one side is not opposite that on the other, and when locked by the key being introduced on the one side, the key must act from the same side to unlock it, and the key when in the lock on one side is not accessible on the other side. According to one arrangement the key acts on the tumbler or tumblers and bolt on the one side (say the outside) as in ordinary locks, but when locked from the opposite side (say the inside) the key cannot be removed from the lock without the bolt being withdrawn or unlocking. According to another arrangement the key may be withdrawn from either side, though the bolt must be brought back, that is to say, unlocked by the key being put in at the same side by which locking was effected.

"CUTTING DOVETAILS."—*W. E. Newton*, Chancery-lane, London. A communication. Dated January 31, 1860.—The object of this invention is to obtain a machine for cutting dovetails of the ordinary form, which extend entirely through the work, and are used for securing together the sides of boxes and similar other articles. The invention consists in the employment or use of rotatory cutters, arranged with movable beds, on which the work is placed, whereby the dovetails may be rapidly and perfectly formed, thus rendering them applicable to cheap work, such as common boxes, to which they could not hitherto be applied by reason of the expense of forming the dovetails.

SUN-BLINDS.—*J. Jeffreys*, Richmond, Surrey. Dated Jan. 28, 1860.—The patentee employs a series of frames of galvanized iron or tanned wire soldered together; these are suspended by cords from a blind-case fixed at the upper part of and outside the window to which the blind is fitted. The suspending cords are so arranged, that the frames may hang horizontally, or nearly so: their inclination may, however, be varied. Pieces of canvas or other fabric of suitable form are attached to the outer edge and two sides of each of the frames, and the piece of canvas or fabric so attached to either of the frames is also secured to the inner edge of the frame next above it, except in the case of the highest frame, and in this case it is attached to a wire carried by the suspending cords at a suitable distance above the upper frame: the pieces of canvas or fabric are thus stretched diagonally from frame to frame. In order to raise the blind, two cords are employed: they are each attached at one end to the blind case, and they then pass downwards in front of the inner edge of each of the frames, and afterwards they return upwards to a roller fixed in the blind-case. By winding up these cords, the frames will be in succession lifted by their inner edges, and will thus be thrown into a vertical position, and when they are fully raised, they enter a blind-case by which, when out of use, they will be sheltered from weather.

* Selected and condensed from the *Engineer's* lists.

## Books Received.

*Construction of the Great Victoria Bridge in Canada.* By JAMES HODGES, Engineer to Messrs. Peto, Brassey, and Betts, contractors. John Weale, Holborn, London, 1860.

WE confine ourselves, on the present occasion, to announcing the publication, by Mr. Weale, of Mr. Hodges' elaborate and elegant book on the Victoria Bridge, constructed for the passage of the trains of the Grand Trunk Railway across the river St. Lawrence. In the dedication to the Prince of Wales, Mr. Hodges describes the book as an "attempt to explain and illustrate some of the difficulties and labours encountered by Her Majesty's subjects in the accomplishment of this important work," the Victoria Bridge. It includes 21 illustrative plates, and 40 engineering plates, giving all the details of construction. It is beautifully got up, and is altogether a worthy record of the extraordinary undertaking it describes. The lithographs and chromolithographs are by Messrs. Kell, Brothers.

We shall take an opportunity to go fully into the subject.

*A History of Wimborne Minster.* London: Bell & Daldy. 1860.

THE ancient collegiate church of St. Cuthberga and King's Free Chapel, at Wimborne, is an interesting edifice. It has recently been restored and reopened; and it was in connection with this restoration and the traits and relics thus brought to light that the present volume was prepared and published. The objects aimed at have been to give a correct account of the building as it now stands; to place on record all that is known of its history; to register the results of the late explorations and draw fair conclusions from them; and to rescue from oblivion any collateral facts, unimportant in themselves, but indirectly bearing on the history. These objects seem to have been very well carried out; and the volume, which is illustrated by sketches, views, and plans, gives a good account of the minster and its history. The names of the builders of the present church have disappeared, as well as those of its benefactors: the foundress is almost mythical; and generation after generation has lived and died without leaving any memorial of the progress of the sacred precincts; which, to a certain extent, therefore, have been left to speak for themselves; but in this instance they have been fortunate enough to have a good interpreter; who, besides, has managed to fish a good deal of additional information after all out of historical and local records.

A terrible calamity befel the church in the year 1600. For many years before that date fears had been entertained for the safety of the spire, which crowned the central tower. As far back as 1547, masons had been sent for to inspect it, and repairs of various kinds had been made at intervals from that time to this. But things were getting worse and worse, notwithstanding that iron bars had been introduced to support it but a short time before; and at last, on a Friday morning, the market day, when the church was more full of people than usual, perhaps to hear the lecturer, it fell. Strange to say, no one was hurt by it; and equally strange, no direct mention of the disaster is to be found in the accounts, though we find collections made for repairing the ruins of the church, and for carrying away stones and rubbish during the next few years. Its fall is thus quaintly described by a contemporary writer, the Rev. John Coker:—

"Having discoursed thus longe of this church, I will not overpasse a strange accident, which in our dayes happened unto it: viz., Anno Domini, 1600 (the choire being then full of people at tenne of clock service, likewise the streets by reason of the markett), a sudden mist ariseing, all the spire steeple, being of a very great height, was strangelie cast downe, the stones battered all the lead, and brake much of the timber of the roofe of the church, yet without anie hurt to the people; which ruin is sithence commendablie repaired with the church revenues: for sacrilege hath not yet swept away all; being assisted by Sir John Hanham, a neighbour gentleman, who, if I mistake not, enjoyeth revenues of the church, and hath done commendablie to convert parte of it to its former use."

Few incidents worth recording occur in the history of the church and school after this time.

The churchwardens' accounts contain some curious and illustrative items. Extracts from these, from so far back as 1475, and for 200 years thereafter, are given in an appendix to the volume under notice.

The venerable saint, "Cuthberga the Virgin," however mythical, must surely have had some relationship, no less mythical it may have been, to St. Cuthbert of the beads (though the Virgin could not have been Mrs. Cuthbert, of course); for we find that respectable old gentleman represented by an image, among the "goods" of the church, with 100 pair of "bedys stones, silver and gilt." Were they *real* St. Cuthbert's beads? and was the image supposed to keep count of its paternosters thereby? St. Cuthbert probably stood side by side with St. Cuthberga; for we observe, about the same time, an item of expenditure for a clue of worsted to make a decent apron for St. Cuthberga, and even for four yards of green silk for her behoof. These "goods" existed shortly after 1475, when a note of them was taken. A little farther on, mention is made of a new "epicaustorium." What was it?—a hypocaust for warming the church? The author under notice queries whether it were not a "boiler;" but for what purpose, unless it were for heating water wherewith to warm the church? It occurs along with "stone and sand" (sabilon) from Kingston, a cartload of "aler pyles," and "castyng doune de lapid."

Candlemas in those days was really Candlemass; for we find, alongside of one of the perpetual items of payment for "mending the orgonys," an expenditure for 46 lbs. of wax at 8d., "for makyng of lyghts against Candlemas." We have also items for "wex agenst Cuthbroggtyde, to make our lady lights and ij torches."

A mysterious entry often occurs in the shape of an acknowledgment of value received of "the two wyves for cakys,"—of "the wyfe of the town for cakys," and of "the wyfe of the land" or "the landwyfe," and "the wyfe of the country," for the same edible. The author guesses that these may have been two women "who made and sold cakes for the benefit of the church, in the same way as the beer was sold," the profits being handed over to the churchwarden.

"Paid for ij bokes of prayers for envadinge of the Turk" seems to have constituted a very early, but rather a hopeless, endeavour, however meritorious, to convert the Turk. But what Turk? The Turk in the abstract? or Lord Bateman's individual Turk,—"*This* Turk"?

Not one whit less odd and obscure is,—"Pd for grease to grease the Bear." Was it not rather a supererfluous act of kindness to "grease the Bear"? The bear was not worth his keep if he did not supply grease to grease the churchwarden. Our author sheds a little spark of light on this mystery, however, by suggesting that the "bear" was the "bier," which was, probably, even then a wheeled vehicle.

But we cannot dwell longer on these topics, and must conclude by reminding our professional readers that, while these merely occupy an appendix, the utility of the volume is comprised in a full and detailed account of the architectural and archæological features of this well-known minster, and of its recent restorations, to all of which we have already occasionally given attention in the *Builder*.

*A Handbook for Travellers in South Wales and its Borders, including the River Wye. With a Travelling Map.* London: Murray. 1860.

THE general features of South Wales during the last twenty years have undergone great changes in social, commercial, and even geographical points of view. The enormous development of mining enterprise and the opening of new railways have peopled districts which were formerly uninhabited. New towns have arisen: new harbours have been formed; and the picturesque counties of South

Wales, particularly those of Gwent and Morganwg, have woke up to a new phase of existence.

It is pleasing and satisfactory to find Mr. Murray persisting in the issues of his approved handbooks to districts of our own fair land. These books cannot but tend to turn the tourist stream away from its continental meanderings, even in spite of his own continental handbooks, and to promote the desire for home tours which has of late arisen amongst us.

The editor of the present Guide has, it appears, lived the greater portion of his life in the district which he has endeavoured to delineate; so that it ought to be a dependable one; as, indeed, it is, so far as we have noted. The information is said to be brought up to the present day in the hope that it will really guide the tourist to what is most worth seeing; but there is no such book without occasional inaccuracies, and the editor, frankly confessing the possibility of this, takes the next best course, short of a perfection not attainable, by soliciting a correction of possible misstatements.

Besides its cathedrals (Llandaff and St. David's; and, as a border edifice, Hereford) and (a very few of) its churches, there are many other objects of architectural and archæological interest in its Mediæval abbeys and castles, its ancient cromlechs and stones, camps, and British and Roman roads. Interest of another kind attaches to its stores of coal, iron, and lead, and its iron works and copper-smelting establishments. Nor is the district unattractive in its social aspects, and its curious customs and superstitions, its kindly inhabitants, their Celtic language, their tall peaked or conical hatted and red flannelled "witches," and their sweet and beguiling music, in some of which, doubtless, we have still the entrancing strains of the rapt Druidical harpers who "sang the night songs" of the hyperborean god.

Mr. Murray is piling up a mighty cairn to his own memory. It is formed of red volumes.

## Miscellanea.

BAD VENTILATION AND DRUNKENNESS.—It has been related, remarks the *Labourer's Friend*, by a person employed by the City Missionary Society of London, whose duties lead him among the inhabitants of St. Giles's parish, that there was scarcely any one of them who might not obtain a comfortable livelihood if he could leave off gin. But it had been shown that many of these persons had been driven to this liquor as affording a temporary relief to the feelings of depression and exhaustion caused by living in a noxious atmosphere; and instances have been known of individuals who, when they were enabled to reside in a less crowded and healthier locality, where pure air was attainable, spontaneously abandoned the practice of gin-drinking. Adopting this view, the number of gin-palaces which flourish in the metropolis not only show a tendency to tippling, but also point out the condition of the habitations of the great bulk of those who frequent these gin-shops.

DRUNKENNESS IN FRANCE AND ITS CAUSES.—While we are introducing French wines to the notice of the lower classes, in the hope that drunkenness may be diminished by their substitution for worse liquors, the mayors and statisticians of France are crying out—"Shut up the wine-shops;" because, according to M. Jules Simon, who has investigated the subject, "drunkenness is the beginning and the end of French industrial life." Considering the character for temperance which the working classes in France have hitherto borne with us, this is somewhat surprising. It appears to be considered, however, by M. Simon and others, that the wine-shops are not to be blamed, at least primarily; but the squalid, uncomfortable homes of the people in the manufacturing districts, where, chiefly, the drunkenness prevails. And nothing can be more likely in such a case, than that—there as here—ill ventilated, close, and unwholesome dwellings, will lead those resident in them to an unnatural craving for stimulants. By reaction, too, of course, drunken habits must render dwellings still more squalid and unwholesome. The testimony of M. Simon applies to England no less than to France, although it is questionable whether the evil and its concomitants be not even worse in France than it has long been known to be in England. If some of the liberal subscriptions which are (figuratively, if not literally) sent to Borrioboola-ga were expended in the improvement of dwellings at home, the money would not only be reproductive of cash profit, but of profit to humanity of a far more important kind.

A CEMENT FOR GLASS.—A transparent cement for glass, it is said, is made by dissolving one part of indian-rubber in chloroform, and adding sixteen parts, by measure, of gum mastic in powder. Digest for two days, and frequently shake the vessel in which these substances are contained. The cement is applied with a fine camel's-hair brush.

KENT ARCHÆOLOGICAL SOCIETY. — On Thursday before last the council of the Kent Archæological Society held a meeting in the council chamber of the Guildhall, Canterbury, under the presidency of Mr. E. Foss, F.S.A. Several new members were elected, and it was proposed, but not finally settled, that the congress should be held at Maidstone in 1861. It was announced that the Society's journal, profusely illustrated, would be in the hands of the local secretaries for distribution among the members in a few days.

NEW WATER ELEVATOR.—An improved apparatus for raising water has recently been exhibited, —the invention of Mr. Robert Nelson, of America. It consists of a large cylindrical receiver underneath, which is attached to the suction-pipe. The vacuum is produced by the combustion of volatilised hydro-carbons. The principle is said to be so simple that a child may employ the machine, which may be kept in full play by the withdrawing and replacement of a valve every six or seven seconds.

THE MAGNETIC TELEGRAPH COMPANY. — The facilities for sending messages by telegraph appear to be gradually approaching the conveniences of our postal system. The Magnetic Telegraph Company are now issuing small adhesive stamps for franking messages throughout their lines in the United Kingdom. The principle is precisely similar to the postage stamp system. A message can be written wherever convenient, and, after affixing the necessary stamp, it can be sent either by post or messenger to the nearest magnetic telegraph station, and thence forwarded to its destination. There is said to be a liberal discount on these stamps in order to assist in bringing them into general use.

FALL OF A CANAL BRIDGE AT MANCHESTER. —Across the Rochdale canal, in the Oldham-road, at the bottom of Prussia-street, and connecting that street in Potts-street, is a narrow wooden-floored iron girder bridge. During some holiday doings, a great number of girls from neighbouring factories proceeded to cross the already-crowded bridge, and a police constable ascended the steps on the Potts-street side to clear the bridge. While doing so, a sudden crack was heard, and immediately afterwards the bridge fell into the canal beneath, carrying with it upwards of 150 persons, chiefly young women. The bridge snapped the stone clean off on the Prussia-street side: on the Pott-street side it moved a mass of stone weighing about two cwts. out of its place, while the bridge fell in an upright position, the centre breaking after it had reached the bottom of the canal, and the crowd upon it were kept standing by the iron railings. A number of men dashed into the water, and the affrighted, half-drowned people were extricated: only one life was lost—that of a child.

AN AGRICULTURAL HALL FOR ISLINGTON.—A company, with limited liability, has been formed for the purpose of erecting an important public edifice at Islington, at a cost of 30,000*l.*, raised by 10*l.* shares: the building will be mainly of glass and iron, and will serve not only for the fortnight's cattle-show of the Smithfield Club, who are its chief promoters, but, it is hoped, as a permanent and attractive exhibition, mainly of an agricultural character. In reference to this project, the *Islington Times* says,—"We fear, however, the directors are about to commit a very awkward *faux pas*. Dixon's Lairs is a well-known spot of ground, having a large frontage on the Liverpool-road, whilst its eastern extremity looks toward Islington-green, from which it is separated by a number of old rickety buildings. Intrinsically of no value, their position on the main thoroughfare of the parish yet gives them a worth sufficiently great to render them an obstacle to all but such an undertaking as we are considering. The removal of these unsightly sheds, for they are little better, would open up a second frontage of far greater importance than that which exists on what was long known as 'the Back-road.' Yet, so it seems, the directors of the new Agricultural Hall are either so ignorant of the locality, or so blind to the interest of the undertaking they represent, that they have not yet seen the wisdom of placing the main entrance in the great northern thoroughfare that runs through this parish, and in the centre of our shops. They purpose placing it on a road which directly leads nowhere."

AUCTIONEERS LENDING ON FURNITURE. — A firm of auctioneers at Birkenhead has been fined 12*l.* 10s., for lending 7*l.* 10s. on a quantity of furniture, and receiving interest thereon, not being licensed as pawnbrokers. The gentlemen who appeared on behalf of the Inland Revenue said the full penalty was 50*l.*, but as defendants, he believed, had acted in ignorance, he only pressed for one-fourth of that amount.

IMPORTANT TO WORKMEN.—A wages case has recently been heard at Warrington. Thos. Hart had been employed for a number of years as a worker in iron at the Callum Forge Foundry, near Warrington, conducted by Messrs. Neild & Co. It is Messrs. Neild's custom always to retain one week's wages in hand. On Saturday, August 25th, there was 1*l.* 5s. due to Hart. On the Monday following, Hart, while at work, in a state of intoxication, assaulted the foreman with an iron bar and rendered him insensible. Next morning, the Messrs. Neild summarily dismissed Hart, and refused to give him any wages. He summoned them for the wages due for the week previous to that in which the *fracas* had taken place.—Mr. Marsh, for the Messrs. Neild, quoted the law bearing on the case, as laid down by Lord Denman and Mr. Justice Coleridge, which showed that "if a party hired for a certain time (whether by the fortnight, month, quarter, or any other period), so conducts himself that he cannot give the consideration for his salary, he shall forfeit the current salary even for the time during which he has served." Mr. Justice Coleridge had also laid it down that "under circumstances of gross misconduct the workman cannot recover *pro ratâ*." The case was dismissed.

SUFFOCATION TO DEATH IN A GAS MAIN.—The Imperial Gas Company are running a large three-feet main from Sloane-street across Hyde-park, a portion of which, about 90 feet in length, passes under the Knightsbridge-road, near Albert-gate. The joints of the mains are first caulked with pitched yarn as tightly as possible: upon this caulking a thick coating of molten lead is run, which is hammered close into the joint by a peculiarly-shaped chisel. With the view, however, of making the mains gas-proof, there is a further process of filling the inside portion of the joint with Roman cement. To enable the two operations of cementing inside and lead jointing outside to be carried on simultaneously, the man who cements is obliged to work several "lengths" up the main, beyond where the outside work is going on, so that the blows of the hammer wedging in the lead will not shake the cement by percussion, which may be the case if the two kinds of work were being done too near each other. The main is made up of 12-feet "lengths," and the cementing men will sometimes be working a couple of hundred feet from the open end of the street. It was while so engaged that the gas man was suffocated. The coroner's jury returned a verdict that the deceased was suffocated by the inhalation of coal gas, and adopted a suggestion of the coroner, that men should not be allowed to work inside more than six lengths of pipe in future.

THE DEBUSCOPE.—A small instrument has lately made its appearance, which it is said will be of great utility to designers and others engaged in the ornamental and decorative arts. It is of French origin, and, as described, consists of two silverized plates of great reflective power, put together in a framework of cardboard or wood, at an angle of 70 degrees. On being placed over a small picture, or design, of any kind, no matter how rough, or whether good or bad, the Debuscope, says a contemporary, "will reflect the portion immediately under the eye, on all sides, forming the most beautiful and elaborate designs, and, by being slowly moved over the picture will multiply new designs to any extent. No matter what the subject is on which the instrument is placed: the result is marvellous: there is produced, from the most unlikely objects, such as scraps of paper-hangings, blots of ink, leaves, flowers, bits of lace, &c.,—an endless series of new and really beautiful designs. Although of the same species, it possesses an advantage over our old friend the kaleidoscope. It gives the design, and that in such a manner that it can be made stationary at pleasure, until copied as new patterns for draughtsmen, calico printers, dyers, paper-hangers, painters, or others. Setting aside the utility altogether, it can be made the means of gratification in the drawing-room, and will doubtless soon assume its proper place, along with the microscope and stereoscope, as a source of amusement at once innocent and instructive." Could not the patterns in some such instrument, and even in the kaleidoscope itself, suitably formed, be readily copied, and fixed as photographs, by aid of the camera?

CHAMOUNIX AND ALBERT SMITH.—A new English church has been consecrated at Chamounix, and the first monumental tablet that decks its walls is an *in memoriam* to Albert Smith.

DEATH OF MR. INGRAM, M.P., PROPRIETOR OF THE "ILLUSTRATED LONDON NEWS."—We regret to learn that the melancholy fact of Mr. Ingram's death by drowning, as reported, on the sinking of the *Lady Elgin* steamer, while on an excursion in the American lakes, is now past any doubt, the body having been identified by two gentlemen who have been many years in his employ, one of whom has at the present moment the custody of the body on its way to England for interment. The body of his son Herbert has not yet been discovered.

FALL OF HAT AND FEATHERS, GOSWELL-STREET. Sir: The surprise in this matter is by no means lessened as the house has been mentioned as an example of good workmanship. Would not a better tie be got for corner buildings by allowing in such cases, timbers to lie in walls? Had the party wall been connected with the accident it would most probably have pushed the building into the street.—A BUILDER.

THE CORT CASE.—Every one knows how deeply the country is indebted to the family of Henry Cort, "the father of the British Iron Trade." A poor pension was at last meted out to Mr. Richard Cort, who is now not far off eighty years of age; but this aid is quite inadequate to relieve him of expenses incurred by his long and tedious efforts to bring the country to a sense of what was due to his father's family, especially in the midst of adversity. It has been decided to raise, if possible, a sum of 100*l.*, for the purpose of setting poor Mr. Cort free from all dunning on this score in his extreme old age, and we earnestly hope the attempt will be successful. The names of numerous supporters of the "Cort Claims," including sixty M.P.'s and 100 other eminent authorities, iron manufacturers, and engineers, may be seen recorded in the library of the Institution of Civil Engineers.

MANCHESTER ROYAL INSTITUTION: EXHIBITION OF PAINTINGS.—The exhibition of paintings at the Manchester Royal Institution for the year 1860 comes before the public under the auspices of the recently-formed body, the Manchester Academy of Fine Arts, as well as through the arrangements of the council of the institution; and as a consequence of the infusion of new blood into the executive, says the *Courier*, the beaten track of former years has been departed from so far that the exhibition has much more the character of an exposition of the state of art generally than it had a few years back. The last two or three catalogues have shown a regular increase of French names; but now instead of having the works of foreign artists dotted up and down the rooms among those of Englishmen, so much of expansion has been given to the liberality noticeable in late years, that we have at last small but complete collections resulting from the labours of "our own commissioner" and other connoisseurs, illustrating the present characteristics of the German, Belgian, and French schools, as well as those of our own.

CURIOUS ALLEGED DISCOVERY IN FLORICULTURE.—It is said that Maylor Tiemann, at his paint factory at Manhattanville, has accidentally made a discovery which threatens to revolutionize horticulture. One of the factory hands having thrown some liquid green paint of a particular kind on a flower-bed occupied by white anemonies, the flowers have since made their appearance with petals as green as grass. The paint had in it a peculiar and very penetrating chemical mixture, which Mr. Tiemann has since applied, with other colours, to other plants, annual, biennial, and of the shrub kind, "the result being invariably that the flowers so watered took the hue of the liquid deposited at their roots." By commencing experiments early next year, during seed time, and applying different colours, we shall no doubt soon be enabled to "paint the lily." For the truth of this wonderful discovery, the *New York Tribune* is responsible. This, however, we can personally testify,—that charcoal put to the roots of dahlias and other flowering plants will redden them vividly, flowers nearly white being thus turned to a deep red, sometimes altogether, and sometimes mixed with the lighter hue in half-a-dozen varieties, from one and the same root. Since noting this curious fact in our columns some years since, it has been repeated, and with success, for several seasons in France, having admittedly been tried there in consequence of reading the paragraph quoted in the *Builder*.

INDIAN-RUBBER SEATS.—Garden-seats, made of vulcanized Indian-rubber, have been introduced as an improvement: their elasticity saves discomfort to the sitter.

CUTTING GLASS.—Alexander Taylor writes as follows to the *Photographic News*:—"In treating of glass, I may give you another way of cutting bottles, shades, or any glass vessel the neat thing you wish, and that is to get a rod of iron heated to redness, and having filled your vessel the exact height you wish it to be cut, with oil of any kind, you proceed to very gradually dip the red-hot iron into the oil, which, heating all along the surface, suddenly the glass chips and cracks right round, when you can lift off the upper portion clean by the surface of the oil. This never fails, and many a couple of servicable bell glasses have I made in this way from a six-pound confection bottle."

HAMMER FOR SHAPING METALS.—An improved hammer, applicable to the manufacture of globular articles, and the formation of borders upon articles of sheet metal, has been patented by Mr. William Spurrier, of Birmingham. He fixes a hammer-head or swage upon the long arm of a lever turning upon a horizontal axis. The short arm of the said lever is operated upon by means of cams, or teeth upon the periphery of a wheel, made to rotate by steam or other power. A rapid reciprocating motion is given to the hammer or swage by the said wheel, and the metal to be shaped is hammered thereby. The metal operated upon is supported on sand in bags or dies, or in some other convenient manner.

MILLSTONE MASONS.—It appears that there are in London a certain number of masons whose special avocation it is to prepare for use a peculiar kind of millstone, known as the French burr. This stone consists essentially of flint. The "picking" of the "burrs" is effected by a steel chisel struck by a hammer, and every stroke is attended by a flash of light and a cloud of dust and small particles of stone. Having seen many of the men as patients at the Victoria-park Hospital, on account of chest affections brought on by their employment, Dr. Peacock was led to make extended inquiries at the places of work, the results of which he embodied in a paper in the *Medical Times*. The subjoined are the principal of his conclusions:—1. That the average age of those engaged in this occupation is very low indeed. Of twenty-three who had been apprenticed to it the average age was only 24·1 years; and one of the foremen stated that the longest period he had ever known a man to work at it was thirteen years. 2. That the fatality among these men is directly due to their inhalation of particles of silex; but that the injurious influence of the latter is much aggravated when the men are intemperate. 3. That the form of the disease induced may be either chronic bronchitis or phthisis, according to the predispositions of the patient. 4. That the presence of the silicious particles in the lung-tissue may be proved by chemical examination.

## TENDERS

For road and drains on building land, on Alleyn's College estate, belonging to W. Phillips, Esq., between Forest-hill and Sydenham-hill. Messrs. Banks & Barry, 27, Sackville-street, architects:—

| | | | |
|---|---|---|---|
| Walker | £959 | 0 | 0 |
| Deards | 855 | 0 | 0 |
| Potter & Love | 802 | 10 | 0 |
| Porter | 789 | 0 | 0 |
| Neave | 772 | 0 | 0 |
| Constable | 731 | 0 | 0 |
| Clarke | 728 | 11 | 6 |
| Colson | 686 | 0 | 0 |
| Morris | 680 | 0 | 0 |
| Beeton | 668 | 0 | 0 |
| Strickson | 660 | 0 | 0 |
| Stacey | 640 | 9 | 9 |
| Hartland & Bloomfield | 627 | 0 | 0 |
| Ladd | 600 | 0 | 0 |
| Hare (accepted) | 586 | 2 | 6 |

For alterations and additions to Buscot Park, Surrey, for Mr. Carew Gibson. Mr. Henry Clutton, architect:—

| | | | |
|---|---|---|---|
| Mansfield | £7,940 | 0 | 0 |
| I'Anson | 7,775 | 0 | 0 |
| Pritchard | 7,748 | 0 | 0 |
| Brass | 7,334 | 0 | 0 |
| Foster | 7,216 | 0 | 0 |
| Myers | 7,060 | 0 | 0 |

For works at Tulse-hill. Mr. Eales, architect:—

| | | | |
|---|---|---|---|
| Clemence | £915 | 0 | 0 |
| Batterbury | 879 | 0 | 0 |
| Airey & Bellingham | 785 | 0 | 0 |

For erecting a house in Long-alley. Mr. J. Tanner, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Taylor | £653 | 10 | 0 |
| Elston | 570 | 0 | 0 |
| Macers | 497 | 15 | 0 |
| Case | 497 | 0 | 0 |
| Brooks | 425 | 0 | 0 |
| Green | 422 | 18 | 0 |

For works at No. 18, Cork-street. Mr. Eales, architect:—

| | | | |
|---|---|---|---|
| Fish | £1,796 | 0 | 0 |
| Batterbury | 1,795 | 0 | 0 |
| Airey & Bellingham | 1,755 | 0 | 0 |
| Conder | 1,747 | 0 | 0 |
| Cowland | 1,576 | 0 | 0 |
| Saunders | 1,568 | 0 | 0 |
| Longmire & Burge | 1,543 | 0 | 0 |
| Smith | 1,485 | 0 | 0 |
| Rudkin, junior | 1,455 | 0 | 0 |

For new Baptist Chapel, Derby. Messrs. Hine & Evans, Nottingham, architects:—

| | | | |
|---|---|---|---|
| G. Myers | £6,301 | 0 | 9 |
| Simpson & Lynham | 4,990 | 0 | 0 |
| Robinson & Freeman | 4,950 | 0 | 0 |
| R. Dennett | 4,925 | 0 | 0 |
| J. Wood | 4,850 | 0 | 0 |
| R. Young | 4,800 | 0 | 0 |
| Edw. Thompson | 4,800 | 0 | 0 |
| Thompson & Fryer (accepted) | 4,590 | 0 | 0 |

For the erection of the Ladies' Invalid Home, St. Leonard's-on-Sea. Mr. Francis H. Fowler, architect. Quantities taken out by Mr. Smithers:—

| | | | |
|---|---|---|---|
| Myers | £3,850 | 0 | 0 |
| Ayers & Co. | 3,762 | 0 | 0 |
| Stap | 3,650 | 9 | 0 |
| Kenwood | 3,635 | 0 | 0 |
| Hughes & Hunter | 3,567 | 0 | 0 |
| Howell | 3,394 | 0 | 0 |

For altering the Literary Institution, Southwark, into a vestry hall for the parish of St. George the Martyr, Southwark.—The tender of Mr. Thos. Rudkin, jun., was accepted by the Vestry Board, from the quantities supplied by Mr. John M. Bryson.

For erecting brick-hut accommodation for 100 soldiers at Hounslow barracks, for the War Department, under superintendence of the Commanding Royal Engineer of the district.—The tender of Mr. Jennings was accepted by the Director General of Contracts, from the quantities supplied by Mr. John M. Bryson.

For cottage at Tilehurst, near Reading, for Mr. Wm. Blandy. Old materials from present house and farm-buildings in addition. Messrs. Poulton & Woodman, architects:—

| | | | |
|---|---|---|---|
| Luker | £1,956 | 0 | 0 |
| Wheeler | 1,935 | 0 | 0 |
| Woodroffe | 1,900 | 0 | 0 |
| Orton & Child (accepted) | 1,593 | 0 | 0 |

For hall and committee-room for West-street Institution, Reading. Messrs. Poulton & Woodman, architects:—

| | | | |
|---|---|---|---|
| E. Strong | £839 | 0 | 0 |
| Orton & Child | 822 | 0 | 0 |
| Leach (accepted) | 761 | 0 | 0 |

For the erection of national schools and master's house at St. Leonard's, Aston Clinton, Bucks. Mr. Frederick Gotto, architect:—

| | | | |
|---|---|---|---|
| Fassnidge | £1,042 | 0 | 0 |
| Honour | 705 | 10 | 0 |

For first portion of the new buildings at Ford, Liverpool. Mr. E. Welby Pugin, architect:—

| | | | |
|---|---|---|---|
| Farrell & Ledger | £1,850 | 0 | 0 |
| Denvir | 1,630 | 0 | 0 |
| Yates | 1,550 | 0 | 0 |
| Steel | 1,444 | 0 | 0 |
| Glaister (accepted) | 1,420 | 0 | 0 |

For a cottage residence at Hartley, near Plymouth, for Mr. Richard Hicks. Mr. O. C. Arthur, architect. Quantities not supplied:—

| | | | |
|---|---|---|---|
| Elliott | £1,480 | 0 | 0 |
| Northcott | 1,460 | 0 | 0 |
| Call & Pethick (accepted) | 1,395 | 0 | 0 |
| Lethbridge | 1,335 | 0 | 0 |
| Marshall | 1,291 | 0 | 0 |

For three new warehouses, Booth-street, Manchester. Mr. Thos. Bird, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Terras | £1,627 | 0 | 0 |
| Thompson | 1,603 | 0 | 0 |
| Neill | 1,592 | 0 | 0 |
| Tully | 1,558 | 0 | 0 |
| Penk (accepted) | 1,549 | 0 | 0 |
| *For the Plumbing and Glazing.* | | | |
| Jaffrey (accepted) | 157 | 0 | 0 |

For three villas at Higher Broughton, Manchester. Mr. Thos. Bird, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Penk | £1,799 | 0 | 0 |
| Terras | 1,769 | 0 | 0 |
| Harrap | 1,733 | 0 | 0 |
| Farrell & Ledger | 1,650 | 0 | 0 |
| Tully (accepted) | 1,576 | 0 | 0 |

For a drapery establishment, Chorlton-upon-Medlock, Manchester. Mr. Thomas Bird, architect. Quantities supplied:—

| | | | |
|---|---|---|---|
| Neill | £916 | 0 | 0 |
| Thompson | 895 | 0 | 0 |
| Savage & Genney | 840 | 0 | 0 |
| Clark & Jones | 829 | 0 | 0 |
| Metcalf & Waterson | 819 | 0 | 0 |
| Vickers | 810 | 0 | 0 |
| Penk | 798 | 0 | 0 |
| Terras (accepted) | 797 | 0 | 0 |
| Tully (too late) | 795 | 0 | 0 |

For three houses at Dartmouth Park, Forest-hill, for Mr. William Rendle. Mr. Thomas Fred. Franklin, architect:—

| | Houses. | Fences. | Total. |
|---|---|---|---|
| | £ | £ | £ |
| Macey | 2,380 | 145 | 2,525 |
| Gammon | 2,259 | 121 | 2,380 |
| Downs | 2,128 | 146 | 2,274 |
| Crawley | 2,079 | 120 | 2,199 |
| Rider | 2,060 | 106 | 2,166 |
| Thompson | 1,988 | 140 | 2,128 |